



Planmeca Emerald™ S User Manual

Table of Contents

Introduction	5
Associated Documentation	5
Indications for Use	5
Contraindications	5
Turn ON Laptop	5
Opening Romexis	5
Scanner	6
Accessories	6
Connecting the Scanning Cable	6
Plugging the Scanner into the Laptop	6
Cradle	7
Relocating the Laptop and/or Scanner	8
External Monitor	8
System Information and Upgrades	8
Software and Hardware	8
Connecting the Scanning Tip	8
Disconnecting the Scanning Tip	8
Cleaning the Scanner Tip	9
Storage	10
Cleaning the System	10
Cleaning/Changing the Scanner Cover	11
Moving/Viewing the 3D Model	11
Rotating the Model	11
Changing the Model Size	11
Moving the Model	12
System Options and Default Settings	12
Screenshots	12
The Settings Screens	13
Scanning Safety	14
Patients	15
Managing Patients in Planmeca Romexis	15
Creating new patients	15
Searching Patients	15
Sorting patients	15
Selecting and opening patients	16
Managing Cases	16
Deleting Files	16
Starting a New Restoration	16
Setup Screen	17
Scanning	19
Scan Tab Layout	19
Scanner Tips	20
Planmeca Emerald S SlimLine Tip	20
Scanner Indicators	20
Planmeca Emerald S Indicator	20
Session Usage	21
Color Balancing	21
Button and Motion Controls	22
Top Button	22
Bottom Button	22

Top and Bottom Simultaneously	22
Positioning the Scanner for the First Scan.....	23
Basic Scanning Steps	24
Model Scanning	25
Scanning Live View	25
Saving a Live Scan Image	26
Eraser Tool	27
ICE View or Stone View	27
Active Delete	28
Generate Model	28
Checking Your Model For Missing Data.....	29
Data Density View	29
Shade Assist	29
Reset Model.....	30
Delete Model	30
Scan Swap.....	30
Scanning Upper and Lower	30
Time Saver	31
Scanning Buccal	31
Bilateral Buccal Bite	32
Prep Clearance and Contact Strength	32
Scanning a Bite Registration.....	32
Bite registration preparation.....	32
Bite registration scanning	33
Goals	33
Selecting the Bite Registration	34
Model Alignment	34
Rotating the Models.....	35
Scanning a Pre-op.....	36
Scanning Impressions	37
Positioning the Scanner.....	37
Scanning the Impression.....	37
Non-Restorative and Full Arch Scanning	39
Full Arch Scanning Pattern	39
Open Bite Scan	40
Scan Body Workflow	40
360° Scanning	41
Scanner Settings	42
HD Snapshot.....	42
Show Edges.....	43
DASH.....	43
Active Delete ON/OFF.....	43
Delete Low Density Areas	43
Model Resolution	43
<i>Margin Tab.....</i>	<i>44</i>
Margin Tool.....	44
Margin Aids	45
View ICE Preparation	45
Show Features	45
Creating the Margin.....	45
Paint tool	45
Trace tool	46
Lasso tool.....	47
Margin Tab Settings.....	47
ICE Margin Mode.....	47
For intraoral cases only.....	47
Modifying the Margin.....	47
Toggle Margin.....	47

Move Margin tool	48
Add Segments tool	48
Retract.....	49
Multiple Restorations	50
Drawing Pontic Margins	50
Selection Area Tool	50
Edit Pre-Op Tool	50
<i>Exporting Data</i>	<i>51</i>
Exporting a CAD/CAM Case.....	51
Exporting 3D Models	51
3D Model Export	51
DDX Export	51
<i>Planmeca Emerald S Specifications</i>	<i>53</i>
Applied Part.....	53
Cables	53
Applicable Standards	53
Product Safety	53
EMC.....	53
Laser Product Safety.....	53
Packaging and Environmental.....	54
Biocompatibility.....	54
European Standards	54
Canadian Standards	54
US Food and Drug Administration	54
International Standards	54
Approvals (All Systems)	54
Guidance and Manufacturer's Declaration - Electromagnetic Emissions	55
Guidance and Manufacturer's Declaration - Electromagnetic Immunity.....	55
Recommended Separation Distances	56
Emerald Optical Specifications	57
Product Identification Labels.....	58
External Components and Connectors.....	58
UL Listing.....	58
UL Medical Equipment Listing.....	58
<i>Troubleshooting/Repair</i>	<i>59</i>
Case Backup	59

Introduction

The Planmeca FIT™ System is a complete optical impression system for CAD/CAM of dental restorations intended for dental offices or laboratories. The system comprises a Planmeca Emerald S digital impression scanner, Planmeca Romexis CAD/CAM design software module, and Planmeca PlanMill.

The Planmeca Emerald S scanner takes digital impressions which can be designed and customized on the Planmeca Romexis CAD/CAM design software. The impressions can be sent via Planmeca Romexis Cloud to Planmeca or a certified laboratory for design and milling or exported to a third party.

Caution: *US Federal law restricts the Planmeca Emerald S to sale by or on the order of a dentist.*

The Planmeca FIT System requires Planmeca Romexis software revision 3.4.0.R or later.

Associated Documentation

Planmeca Romexis User's Manual (publication number 10014593).

Throughout the documentation, important notes and items of interest are formatted like this example.



Warning The orange Warning denotes something that can cause personal injury or physical damage to the equipment.

Some of the screenshots may have been taken in earlier software versions and may not exactly match your screen.

Indications for Use

The Emerald S Optical Impression Scanner is an optical impression system used to record the topographical characteristics of the dentition and/or full arch and preparation areas (including features such as implant scan locator fixtures, braces, brackets, etc.). In addition it can record the topographical characteristics of the oral anatomy (such as soft tissue, gingivae and palate).

The three dimensional model generated from the scan may be further used for study models, and for the design and manufacturing of dental restorations including implant supported prostheses and full and partial frameworks, and can be used to design and manufacture physical models of the teeth.

It may be used in conjunction with production of orthodontic appliances, retainer and accessories.

Contraindications

The device is not intended for use with indications other than those specifically mentioned.

The device is not intended to provide direct diagnosis or, to replace the decision of the dentist, with regard to clinical acceptability of the manufactured restoration.

Turn ON Laptop

Press the power button to start the laptop.



Opening Romexis

Click the Romexis icon on your desktop to open the software.

Scanner

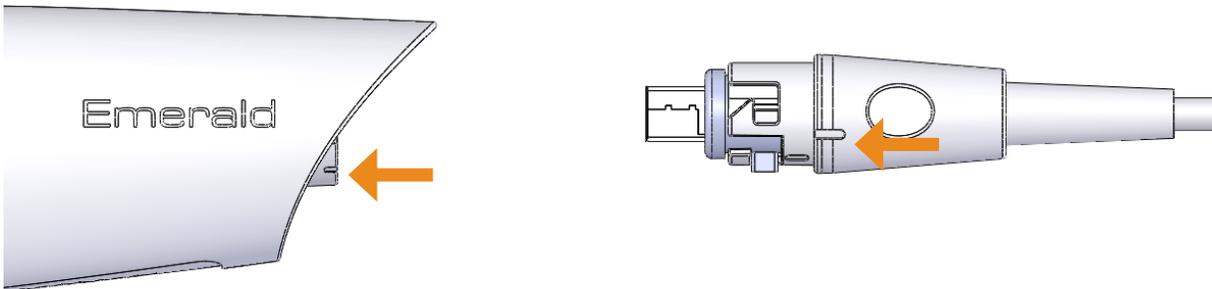
Accessories

The Emerald S system has a set of removable components.

- Scanning Tip
- Scanning Cable
- Multiple Scanner Covers
- Cradle
- Color Balancer
- Laptop
- Mouse

Connecting the Scanning Cable

1 To connect the scanner cable, align the notch on the cable to the small notch on the back of the scanner.



2 Push the cable in and turn clockwise until the notch on the cable is aligned with the larger notch on the back of the scanner.

3 Keep the scanner connected to the cable at all times. Remove the cable from the scanner only when directed by Customer Support or when replacing the cable.

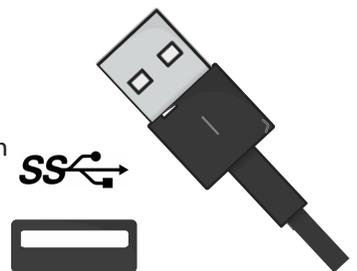
Plugging the Scanner into the Laptop

Insert the USB-C cable into a USB 3 port on the laptop. All of the ports on the Planmeca laptop are USB 3.



If you are not using a laptop provided by Planmeca, refer to your laptop's user manual to find the USB 3 port. Laptop must have an appropriate NRTL mark for compliance with IEC 60601-1 or IEC 60950.

Pull the USB connector from the laptop when the scanner is not in use. You do not need to "eject" the USB device from Windows. Do not pull on the cable to disconnect. Bending or twisting the cable may impact system usability.



Cradle

The system comes with a standalone cradle for the scanner.



The cradle can be separated and inserted into a holder in your operatory equipment (i.e. the slow speed suction holder).

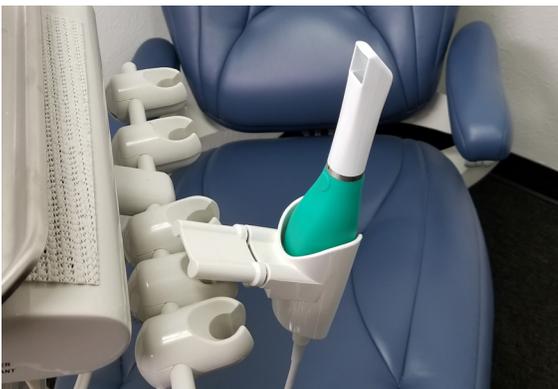
Squeeze the grey trigger and pull to separate the cradle from the base. The trigger is used every time that you want to insert or remove the scanner holder.



Insert the cradle into the chair adapter.



Insert the holder into a holder in your operatory equipment.



Relocating the Laptop and/or Scanner

The laptop can be unplugged and moved as needed. The software does not need to be shut down. The scanner can be disconnected at any time.

External Monitor

Connecting the laptop to an external monitor is NOT recommended; it requires extra resources from the graphics card. This can significantly reduce scanning speed.

System Information and Upgrades

Software and Hardware

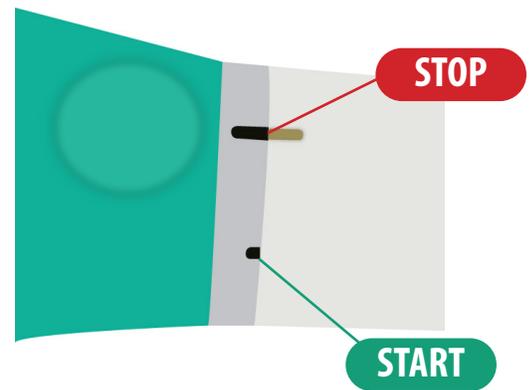
System software and hardware upgrades are initiated through Planmeca only. No software or hardware should be added or deleted to/from the Planmeca systems without prior approval of Planmeca. Doing so may result in damage to the system and will void the product warranty.

Connecting the Scanning Tip

(After disinfection if scanning intraorally. See insert with scanning tips for further details.)

- 1 Grasp the body of the scanner with one hand.
- 2 Use the other hand to slide the scanning tip onto the scanner as shown. Line the mark on the tip up to the smaller mark on the scanner body. Twist the scanner tip to lock it into place. Ensure the marks on the tip and the base are aligned.

Failure to follow this procedure can damage the scanning tip.



Disconnecting the Scanning Tip

- 1 Grasp the body of the scanner with one hand.
- 2 With the other hand, twist the scanner tip to the unlocked position and remove it.

When the scanner is not in use, place the non-functional protective scanner tip on the scanner. *(Included with the scanner during shipping.)*

Cleaning the Scanner Tip

For intraoral scanning systems only.

The following instructions are for the removable tip of the scanner. It is not for the entire scanner. See "Cleaning the System" on page 10 for cleaning the base of the scanner.



The scanning tips have been manufactured and tested for specific disinfection protocols. Operational, maintenance and replacement instructions should be followed for the product to perform as designed. Cleaning the scanner tip incorrectly may result in incomplete disinfection and/or permanent damage to the tip.



DO NOT use a chemical sterilant on tips with the autoclave symbol.
DO NOT place in Ultrasonic Cleaner.
DO NOT pouch with other instruments.
DO NOT stack the tips near or on any other metal instruments.
Excessive cycle times may prematurely reduce the life and function of the tip.

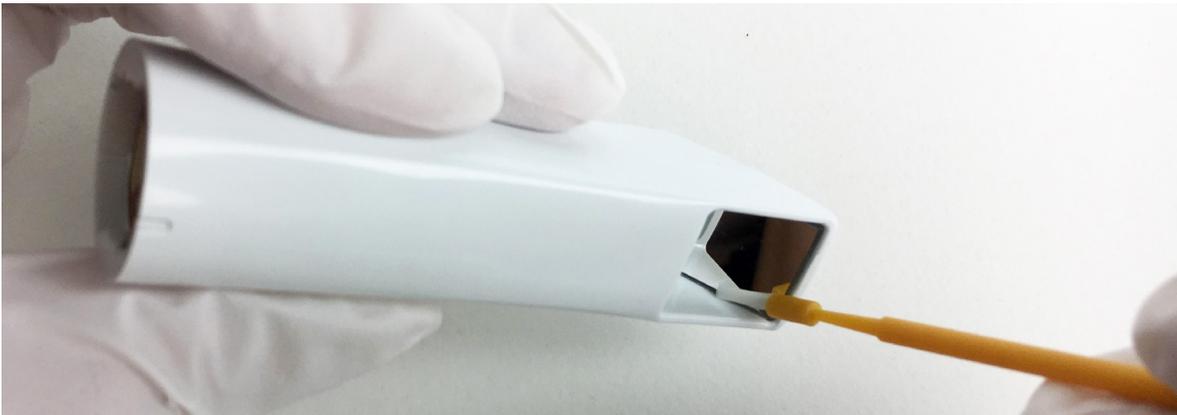
- 1 Remove the scanner tip from the scanner.
- 2 Rinse and brush the **external surface** of the tip under warm running water (3-3.5L/min @ 30°-35°C [86°-95°F]) for a minimum of 15 seconds, with emphasis on the tip alignment indicator. Use a soft bristled brush, like a soft toothbrush.

To prevent scratches, avoid brushing the mirror.

A typical water faucet should be able to produce a flow rate of between 4-8 Lpm.

- 3 Rinse and brush around the **edge and surrounding crevices of the mirror** under running water for a minimum of 30 seconds. **To avoid scratching the mirror, use a soft bristled brush. Be careful that only the bristles are in contact with the surface of the mirror.**

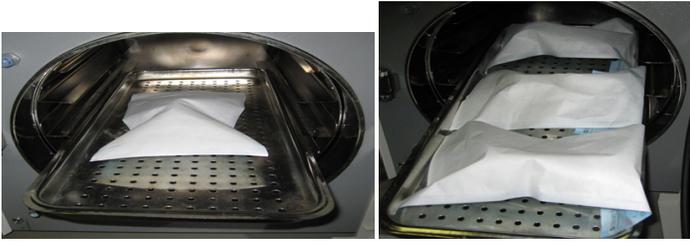
The example picture is shown without running water for visibility purposes. Use the bristles of the small brush on all crevice edges of the mirror. (ex. Pinn-Point Brush 933-0321 shown)



- 4 After brushing, rinse the mirror and surrounding crevices under running water for an additional 15 seconds.
- 5 If there is any visible debris remaining after performing the cleaning steps above, repeat the process as necessary until the tip is visually clean. If there is any debris that cannot be removed or, if there is visible deterioration such as cracks or discoloration, the tip should be properly disposed of and replaced.
- 6 Individually pouch each scanner tip using an autoclave pouch.

Autoclave baskets are not recommended for this cleaning procedure.

- 7 Place one to three pouches per tray or cassette. **DO NOT stack tips on or around other metal instruments.**



- 8 Select the **Wrapped, Wrapped Instruments**, or **Pouch** cycle on the autoclave with a minimum cycle of 132° C (269° F). Minimum sterilization time of **3 minutes** for **Pre-Vac** autoclaves. Minimum sterilization time for **Gravity** autoclaves is **10 minutes**. For any autoclave, use a minimum dry time of **10 minutes**.

These cycle times are for pre-vacuum autoclaves. Autoclave cycle names differ among manufacturers. Autoclave sterilization cycle times exceeding 10 minutes could be considered excessive and may damage the internal components and pin connector points. Reference your manufacturer's manual to select the cycle for sterilizing wrapped instruments.

- 9 Prior to scanning, visually confirm the scanning mirror and scanner connection points of the scanning tip are clean and dry. To clean either surface, use an optical cloth or 2x2 gauze with a small amount of alcohol to gently remove residue. Ensure each surface is dry before connecting it to the scanner.

Storage

- 1 Wipe water off mirror using non-woven optical wipes (recommend Kimwipes Lens Cleaning #101-7070).
- 2 Optional: Insert tip into a sterilization pouch. (recommend Self Seal Sterilization Pouch 5 ¼" x 10" [200/box] #112-4854)
- 3 Store for later use.
- 4 Prior to scanning, visually confirm the scanning mirror and scanner connection points of the scanning tip are clean and dry. To clean either surface, use an optical cloth or 2x2 gauze with a small amount of alcohol to gently remove residue. Ensure each surface is dry before connecting it to the scanner.

Cleaning the System

For intraoral scanning systems only.

Protect the keyboard with a disposable barrier.

Cleaning Cycle: Before and after each use, clean all areas of the Planmeca System.

Warning: Before and after each use, follow these instructions to disinfect the Planmeca System.

Do not substitute any other cleaning solution or procedure. Under no circumstances should you use any paint thinner, solvents, or harsh chemicals. Use only a non-woven sponge or pre-moistened germicidal cloths when cleaning the Planmeca System.



- 1 Using a clean, non-woven sponge that has been saturated with a hospital grade, TB-rated germicide or pre-moistened germicidal cloths, apply the germicide to the entire surface of the scanner base, scanner holder, mouse, mousepad, and any other surfaces that you touch that were not covered by a disposable barrier. Do not spray the germicide directly on the items and do not submerge the scanner or mouse in the germicide.
- 2 Follow the germicide manufacturer's instructions.

Cleaning/Changing the Scanner Cover

The rubber part of the scanner should be removed once a month for cleaning. This part is often referred to as the “sleeve”, “boot”, or “cover”.

- 1 Start on the bottom of the cover and flip/roll it upwards.
- 2 Flip/roll the bottom of the top of the scanner.
- 3 Continue rolling the cover upwards until you can pull it off.



- 4 Clean the cover and base with germicide as stated in “Cleaning the System” above.
- 5 Ensure the cover is right-side-out and slide it back onto the scanner.



Moving/Viewing the 3D Model

Use the mouse to zoom in or out, move, and rotate the composite model.

Rotating the Model

- 1 Click and hold down the right mouse button.

The pointer changes to .

- 2 Drag the mouse horizontally, vertically, or diagonally to rotate the image.

Drag in small increments for more control.

- 3 Release the mouse button to stop rotating. Repeat as needed.

Changing the Model Size

Use the scroll wheel on the mouse to zoom in and out on the model.

- 1 Position the pointer on your model.
- 2 Rotate the mouse wheel downward, toward your wrist.

The pointer changes to  and the model becomes smaller.

- 3 Rotate the mouse wheel upward, away from your wrist.

The model becomes larger.



Moving the Model

The model can be moved without being rotated.

- 1 Position the pointer on the model.
- 2 Press and hold down the mouse wheel.



The pointer changes to .

- 3 Drag the model to the desired position and release the mouse wheel.

System Options and Default Settings

Individual tabs are used to design the restoration: Setup, Scan, Margin, Design, and Mill. The tabs are dynamic. The choices you make on each tab affect the options available on that and related tabs. The typical restoration utilizes the tabs from left to right. Moving backwards in the process (e.g., modifying the settings in the Margin tab after completing the design in the Design tab) can cause settings and designs to be discarded. The system warns you when your actions will cause design data to be discarded.

Some system configurations will restrict the use and access of individual tabs.

Screenshots

You can save an image of the screen for communicating with associates or Customer Support. The directions vary based on the keyboard setup on your laptop.

Look for the Print Screen button (Prt Scr) on your keyboard:

- If Print Screen is in white or black font (matches the rest of the keyboard), press  + **Prt Sc** keys simultaneously.
- If Print Screen is in blue text on the function keys, press  + **Fn** + **Prt Sc** keys simultaneously.

The computer takes a screenshot and saves it in **Libraries - Pictures - Screenshots**.

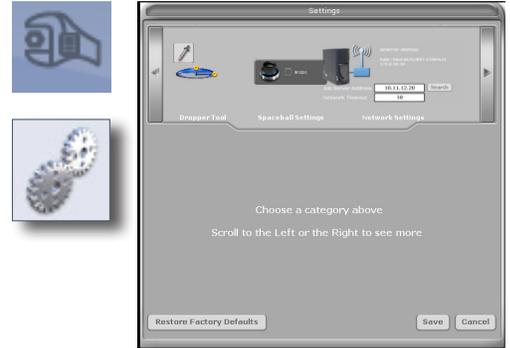
The screenshots are automatically numbered. You can rename them if desired.

If you are using a 3rd party laptop, please refer to that computer's user manual for how to take and retrieve screenshots.

The Settings Screens

Click the Settings button on the CAD/CAM screen or the Settings button on each tab. These screens contain preference settings that modify the default behavior of the software. The settings are based on each screen. Use the arrows to scroll right or left. Click a category to select it. Selected categories display in the bottom of the screen.

Click **Restore Factory Defaults** to revert to original settings, click **Save** to save changes, or click **Cancel** to exit without saving.



Version

Displays the version of the software and imaging systems.

Spaceball Settings (Optional accessory)

Reset Warnings

The warning and reminder screens have an option to **Do Not Show This Message Again**. If a new operator is using the system, you can reactivate these warnings.

Mill Network Settings (For mill systems)

Sprue Angle Method (For mill systems)

Workbook Exercises (For Classic systems)

Margin Ramp (For design systems)

Mill Notification Settings (For Classic systems)

Spacer Thickness (For design systems)

Milling Settings (For mill systems)

Dropper Tool (For design systems)

Auto or Occlusal POI (For mill systems)

Additional Assistance

Go to <http://planmeca.com/training> for information about training. If you have questions, please contact Customer Support at:

Toll Free	800-537-6070
E-mail	customersupport@planmecausa.com
Hours of Operation	7 am – 6 pm CST (Monday - Friday)
Web site	www.planmeca.com
Mailing Address	Planmeca USA 2600 Forbs Ave Hoffman Estate, IL 60192, USA

Scanning Safety

Warning: Failure to adhere to all safety warnings may result in personal injury, equipment damage, or data loss.



Do not use the Planmeca products for any purpose other than its intended and labeled use.

To prevent electrical shock, do not open any sealed or user restricted access panels or connectors.

In case of emergency unplug the computer power cord from the wall or from the computer.

Do not make any unauthorized repairs or modifications to the system software or hardware. This includes installing unauthorized software on the host computer system or altering or bypassing any safety switches or mechanisms. Changes or modifications not expressly approved by Planmeca could void the user's authority to operate the equipment and/or void the warranty.

Do not install or operate the Planmeca products in an environment where an explosion hazard exists, e.g., high oxygen area.

Comply with all applicable regulations when disposing of waste materials from the Planmeca products.

Do not attach any equipment or devices to the Planmeca products unless their use has been specifically authorized by Planmeca or E4D Technologies.

Medical electrical equipment requires special precautions regarding EMC (Electromagnetic Compatibility). The Planmeca products must be installed and placed into service according to the EMC information provided in the documentation that accompanies the Planmeca products.

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Planmeca Emerald, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result. The wireless components in the Planmeca products may be interfered with by other equipment, even if the other equipment is fully compliant with CISPR (International Special Committee on Radio Interference) emission requirements.

When possible, electrical equipment should not be used when adjacent to other electrical equipment. If adjacent use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

When connecting the Planmeca components, use only the cables supplied with the products. Failure to do so may result in increased electromagnetic emissions or reduced immunity to external electromagnetic emissions.

If you suspect equipment malfunction or failure, discontinue using the Planmeca products and contact Technical Support immediately. Do not attempt to make any repairs on the Planmeca products.

Read and comply with all safety, warning, and instructional labels on the Planmeca products.

If the scanner has been operational for an extended period of time, the surface may become warm to the touch. If the temperature becomes too warm to the touch within a minute of use, turn it off and allow it to cool.

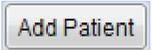
Note: The emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

Patients

Managing Patients in Planmeca Romexis

Creating new patients

- 1 In Patient Management, click the **Add Patient** button.



The Add Patient screen opens.

- 2 Enter the necessary information and add a face photo if desired.

The obligatory fields are in bold text. See the Romexis User Manual for more information.

- 3 To save the patient into the database click the **Save** button in any section.

The changes are not saved unless Save button is used.

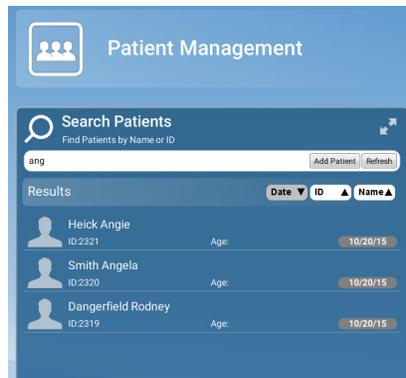
To view the newly created patient on the list, perform new patient search.

Searching Patients

Patients can be searched by ID or by name.

In Patient Management, type any part of the patient's name or ID number into the Search field. Matching items automatically appear as you type.

The system looks for the letters or numbers anywhere in the patient's name or ID. Angela, Angie, and Dangerfield are all matches for "ang" in the Search field.



Sorting patients

Patients in the patient list can be sorted by the Date their records were previously accessed, their ID number, or their last Name.

To sort patients click the desired sort button.



Selecting and opening patients

- 1 Click the patient name in the patient list.

The patient's file opens.

The name of the active patient is always visible in the upper right corner of the screen. Several patient records can be open at a time but only one of the open records is active at a time.

To close the active patient click the **Close Patient** button.



To view all open patients click the arrow of the drop-down menu.

To select and modify another open patient, select the name from the drop-down menu.



- 2 Click **Go to CAD/CAM** in the Next Steps section at the bottom of the screen or on the Charms menu on the left side of the screen.

Managing Cases

- 1 Open the desired patient.
- 2 Click **Go to CAD/CAM**.

Select what you want to do:

- Start a new restoration - See below for more information
- Open an existing restoration - See below for more information
- Import 3D models - See Planmeca Romexis User's manual for more information
- Export 3D models - See Planmeca Romexis User's manual for more information

Deleting Files

To delete an image (stl file) from the patient's case files right-click on the file and select **Inactivate STL**.

To delete a case from the patient's case files right-click on the case and select **Inactivate restoration**.

To reactivate or permanently delete a case from the database see the Romexis User Manual.

Starting a New Restoration

- 1 To start a new scan, click **New Scan and Design**.

*Click **New Scan Only** if you do not have a design license.*

- 2 To open an existing scan or restoration (crown, inlay, onlay, etc.) double-click a case on the list or click the **Open Restoration** button.

The case opens in the Setup screen.



Setup Screen

Use the Setup screen to set the restoration type, occlusal data type, material, and tooth library. If you open an existing restoration, many of these settings may already be selected.

For diagnostic cases, orthodontic aligners, or when sending a large restorative case (without drawing margins) to a laboratory, select Non Restorative as the restoration type, select Open Bite if needed, and click Scan to proceed.

Open Bite is used for sending data to your lab for a night guard and other such appliances.

The Setup screen must be filled out for restorative cases.

The Setup screen requires that the settings be made in a particular order because certain parameters depend upon previous selections. Always define a restoration in the following order:

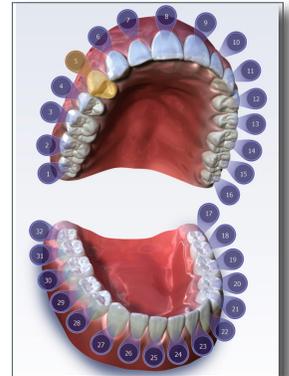
- 1 Select a restoration site by clicking on the anatomical model. If no teeth have been selected, the anatomical model is closed until the mouse cursor is moved near it.

The currently selected tooth is orange. If any other teeth are part of this restoration file, they are green.

For bridges, select the abutments and the pontic(s).

You can do up to 16 restorations on the same arch at one time.

To change the tooth numbers, see the Romexis User Manual.



- 2 Choose the restoration type.



- 3 Select the opposing scan type.

The majority of exported case recipients will require Buccal/Opposing cases. Bite registration cases can only be sent to another PlanCAD system.



For Scan Only cases, the library and material selections can be randomly selected.

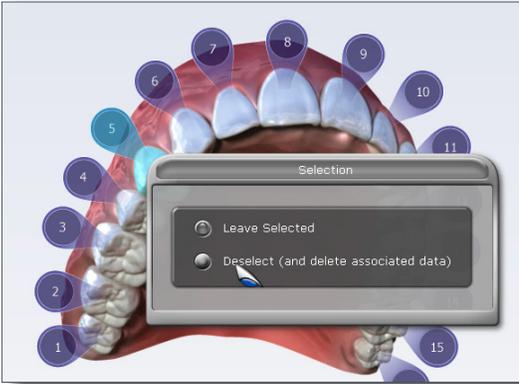
- 4 Specify a tooth library. See the PlanCAD manual for more information.
- 5 Specify a material. See the PlanCAD manual for more information.
- 6 Specify a translucency (not applicable for all materials).
- 7 Specify a shade. See the PlanCAD manual for more information.

Repeat these steps if you have multiple restorations.

- 8 Click the **Scan** screen or click **Next**.

Changing the Tooth Selection

- 1 If the wrong tooth was highlighted for the restoration, right-click the tooth and click **Deselect**.



- 2 Click on the correct restoration site.

Scanning

Warning The scanner is a high precision Class 2 laser scanning instrument. Always store the scanner in its cradle when not in use. To prevent damage or misalignment, do not drop or strike the scanner. Follow all stated precautions when using the scanner.

The scanner captures the restoration site with a laser system and delivers live images to the monitor. As you capture images, the system creates a composite model, revealing any areas that need further scanning.

Ensure the power cord is being used on the laptop while scanning.

Scan Tab Layout



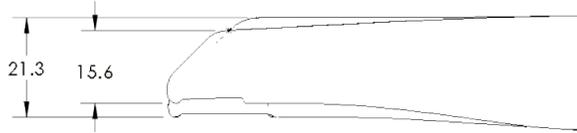
- 1 Scan Type
- 2 Scanner Indicators
- 3 Model Editing Tools
- 4 Evaluation Tools
- 5 Alignment Tools

Scanner Tips

Tip can be removed and disinfected while the next tip is being used. See “Cleaning the Scanner Tip” on page 9 for more information.

Planmeca Emerald S SlimLine Tip

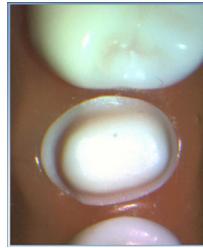
SlimLine is 5.7 mm thinner than the standard tip. SlimLine logo is on the tip and the S displays on screen when in use.



Emerald S Standard Tip



Emerald S SlimLine Tip

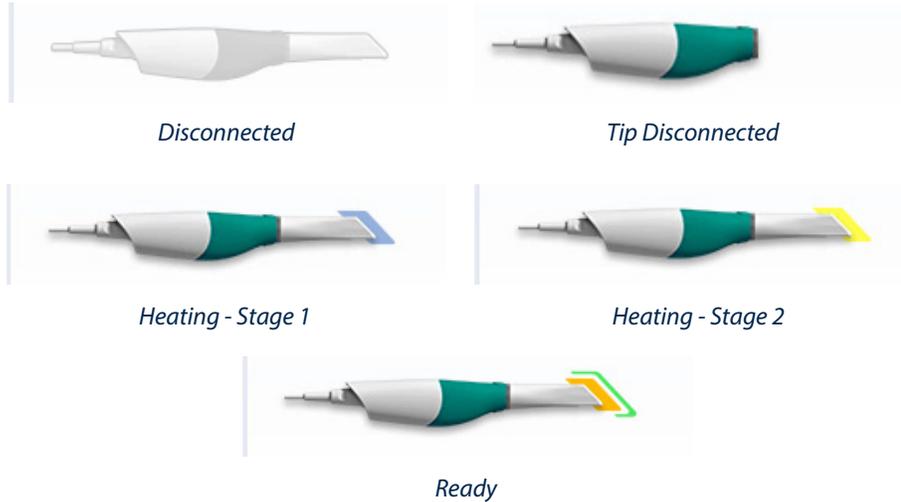


30% smaller field of view



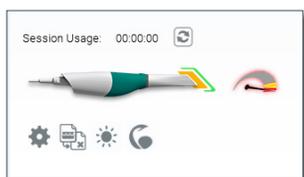
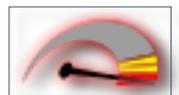
Scanner Indicators

Icons in the lower-left corner of the screen indicate the status of the scanner.



Planmeca Emerald S Indicator

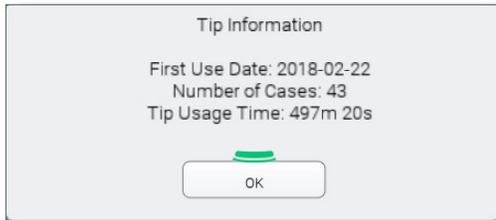
This icon indicates that a Planmeca Emerald S is connected to the laptop.



Session Usage

Session Usage is displayed above the scanner status icon and shows how long you have been scanning on this particular case. This number refreshes each time the Scan screen is opened or when you click the Refresh icon next to it.

Click the tip of the scanner graphic to see the Tip Information.

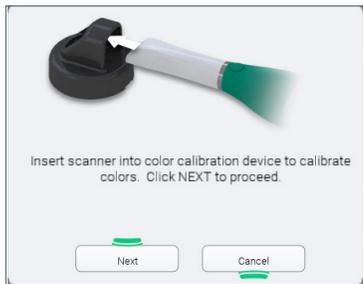


Color Balancing

The color symbol displays when a color tip is in use. Balance the color weekly or as needed. This is an optional step to optimize the color represented on screen. This does not affect the stone model nor the amount of data collected by the scanner.

- 1 While in the scanning screen, click the color symbol to optimize the color.

A new screen appears.



Insert the scanner with sterilized color tip into the device as shown before clicking **Next**.

Another screen appears with the results. If there is a problem, try again. If problems continue, contact Customer Support.

If contamination occurs, clean with a germicide wipe. Do not autoclave.

Store the Color Balancer in a plastic bag or keep a dust cover on it.



Button and Motion Controls

Top Button

- Activate scanner
- Deactivate scanner
- Press and hold the top button and tilt the scanner to rotate the model.
- You can use the button instead of a mouse click to activate a button when you see this icon.



Bottom Button

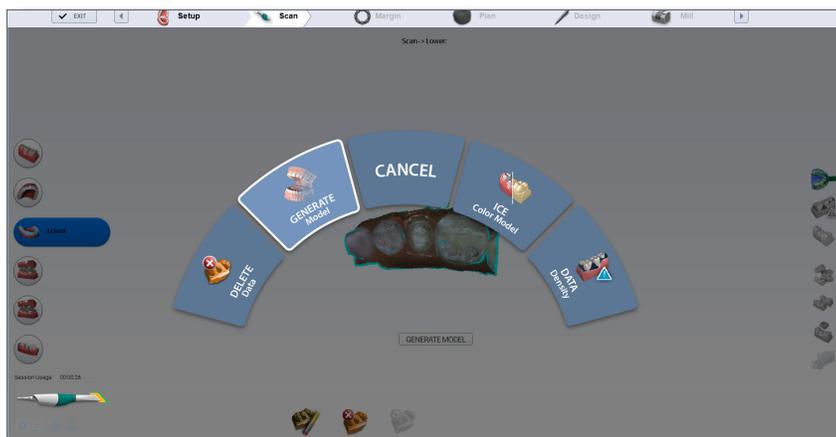
- Switch Scan Types
- While scanning (Live View is open), click to turn ON/OFF the Active Delete functionality. See “Active Delete” on page 28 for more information.
- While scanning (Live View is open), press and hold to take a Snapshot. See “Saving a Live Scan Image” on page 26 for more information.
- You can use the button instead of a mouse click to activate a button when you see this icon.



Top and Bottom Simultaneously

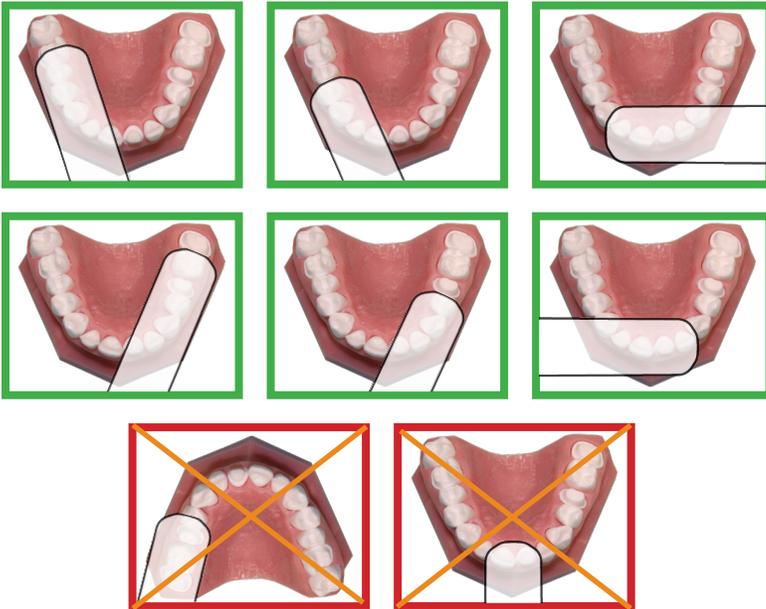
Hold down both buttons simultaneously. A menu appears. Point the scanner towards the screen and rotate the scanner clockwise or counter-clockwise to highlight the desired action and then release the buttons.

- Delete Model
- Generate Model
- ICE view
- Data Density



Positioning the Scanner for the First Scan

Position the scanner along the mesial-distal axis with the tip of the scanner pointing towards the distal. The axis follows the curve of the arch. The pictures below show good and bad positions along the arch.



Rest the tip of the scanner gently on the teeth during scanning. This will give you the correct focal depth for the scans.



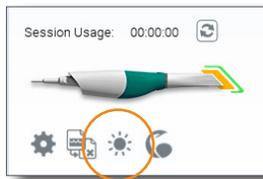
Basic Scanning Steps

- 1 Click **Scan** at the top of the screen.
- 2 Click the desired scanning mode: **Pre-op**, **Upper**, **Lower**, **Buccal**, **Bite Registration**, or **Scan Body**. Options based on Setup screen selections.
 - **Pre-op** - Used to utilize the patient's existing dentition or a wax-up as the pre-op model for creating the restoration.
 - **Upper** - Scan desired section of the upper arch.
 - **Lower** - Scan desired section of the lower arch.
 - **Buccal** - Scan the buccal bite. See Scan Buccal section for details on full arch scans.
Buccal 2 - Optional second buccal scan for large cases. See "Bilateral Buccal Bite" on page 32 for more information.
 - **Bite** - Used if you have produced a bite registration for use in defining the occlusal anatomy.
 - **Scan Body** - In the US, Scan Body scan type is used for exported cases only.
- 3 Shield the site from strong extraneous light sources (dental lights, sunlight, etc.).
- 4 Click the top button on the scanner to activate the laser.
- 5 The Live View displays the scanning view with live feedback. The system assumes that the first scan is taken from the occlusal and the model is orientated accordingly.
- 6 Scan until the composite model is fully formed.
- 7 Click the top button on the scanner to deactivate the laser.
- 8 Evaluate the model. Scan more if needed.
- 9 Click the bottom button on the scanner, click the **Generate Model** button, or press **M** on the keyboard to finish building the model.
- 10 Make adjustments as needed.
- 11 Click the bottom scanner button or use the mouse to select the next scan type.
- 12 Repeat the steps above.
- 13 Click the **Margin** screen or click the **Next** button when finished with scanning.



Model Scanning

The default setting for the scanner is for intraoral scanning. Click the sun icon next to the scanner icon to switch to a dimmer setting (sunset icon) when needed for models or anytime the live view is too bright.



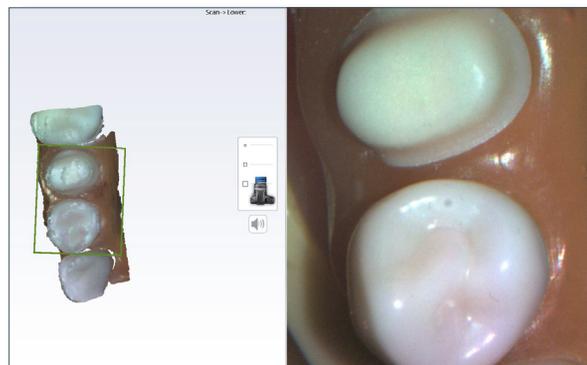
Default setting - sun icon represents brighter laser for intraoral use.



Activate the dimmer setting for external scanning.

Scanning Live View

The system displays a model based upon the scan data. The Live View appears on the right and the model builds on the left. Watch the model building on the left to see what information has been captured and where you need to move the scanner.



*Press the L key to lower the brightness level of the Live View, if needed.
Press Shift+L to return to the default Live View.*

An audio tone plays to indicate that the system is capturing data. The system stops the audio feedback if you have moved too far and the system needs data overlap.

Mute or change the volume on your laptop to change the audio feedback.

The Scanning Distance indicator box shows the current focus area and the outline color changes according to how close or far the scanner is from the focus area. The color ranges from green (close) - orange - red (far).

The building model rotates to match the Live View.

While the scanner is active, use the bottom scanner button to show/hide extraneous data on the model. See "Active Delete" on page 28 for more information.

Click the top button on the scanner to stop scanning.

A raw data model is displayed.

Saving a Live Scan Image

Press and hold the bottom button or hover over an area until you hear the camera shutter sound. This automatically saves an HD snapshot of the Live View and adds the image to the ICE view of the model and adds the picture to the patient's file. The file saves in the patient's directory as a .png image. Easily share photos with your dental team or use it as a patient education tool. Accessing the photos differs based on your scanning software.

- **Planmeca Romexis v4.6**
 - a. Open the **2D** module.
 - b. Click **Refresh**.
 - c. Click **Photos** to view the captured pictures.
- **Planmeca Romexis 4.5 and prior**
 - a. Open the **This PC** or **My Computer** in Windows Explorer.
 - b. In the address bar at the top, type **%temp%** and hit **Enter**.
 - c. Open the **cadcamtemp** folder.
 - d. Open the **patients** folder.
 - e. Type part of the patient's name in the Search field and hit Enter.
 - f. Open the desired patient folder.
 - g. Open the **restorations** folder.
 - h. Open the desired case folder.
 - i. Open the **snapshots** folder. The captured images for this case are in this folder.
- **Design Center** - To manually locate the patient images, navigate to: **C:\d4d\DesignCenter\patients\patient_name\restorations\case\snapshots**. Replacing **patient_name** with your patient and **case** with the date and time of the case.

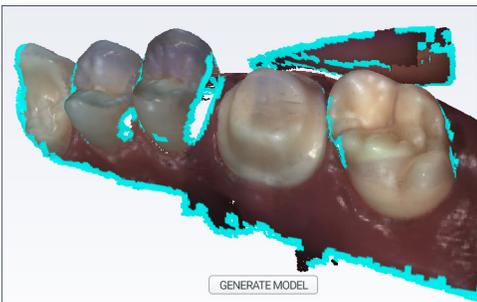
The snapshot is added to ICE View by default. This can affect the overall look of the ICE model and can be deactivated if desired. See "Scanner Settings" on page 42 for details on how to change the settings for this feature.



HD Snapshot applied to ICE

Evaluating Your Model

Before generating your model, rotate it to look for low data areas in key areas: the preparation, interproximal contacts, etc.. In the example below, there is missing data on the interproximal area and extraneous data from a finger accidentally being scanned.



Fill in missing data where needed.

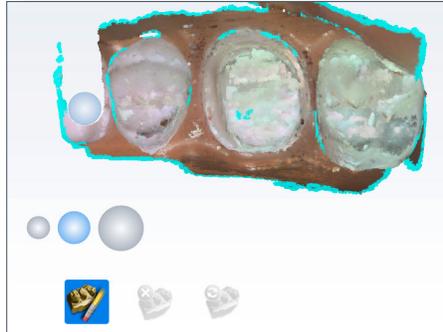
Eraser Tool

Use the **Eraser Tool** to remove parts of the scanned model. This can be used to remove unnecessary data like extra teeth, tongue, cheek, etc.



The Eraser is also used in the Pre-op and Bite Registration Time Saver tools (see following sections).

Click the Eraser tool to deactivate it.



It is recommended that you not delete multiple teeth in a row. Large gaps in the model is not recommended.

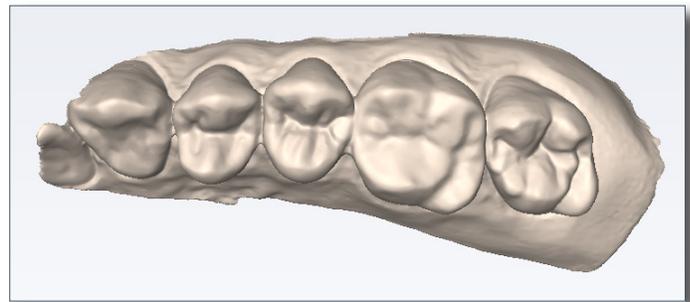
If the data that you want to erase is touching the model and cannot be removed with the regular erase tool, use Active Delete.

ICE View or Stone View

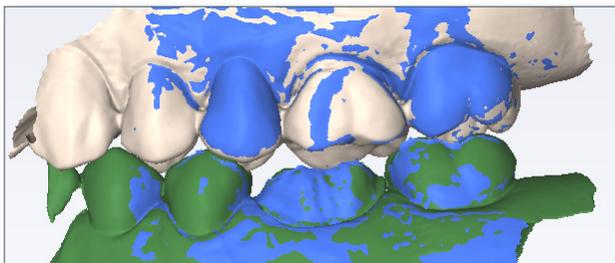
The default setting is for models to be viewed in ICE View. Deactivate ICE View to see the model all in one color.



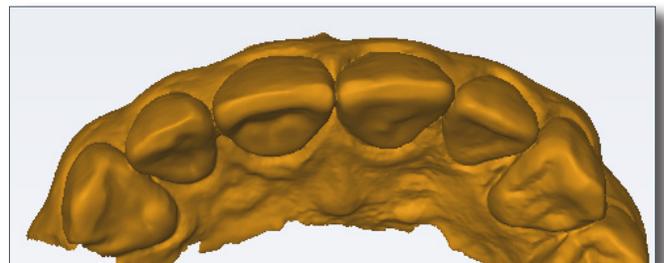
ICE View



Stone View - Upper



Stone View - Upper beige, Lower green, Buccal blue



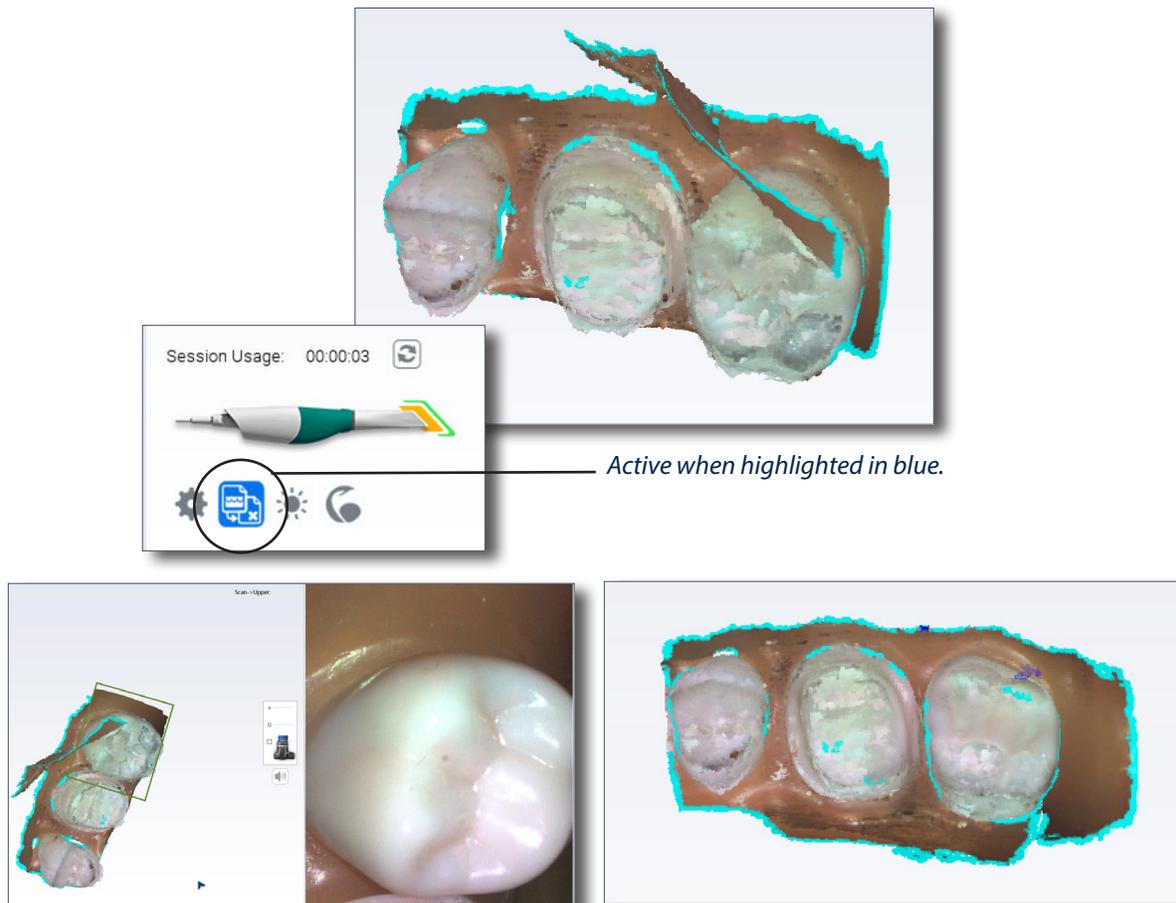
Stone View - Pre-op

Active Delete

Active Delete gives you the opportunity to remove unwanted data that was scanned inadvertently. Active Delete is turned OFF by default. See “Scanner Settings” on page 43 for information on how to change the default to ON.

There are two methods to turn this tool ON/OFF. The first way is to click the Active Delete icon underneath the scanner in the lower left of the software. The second is to depress and release the bottom button of the Planmeca Emerald™ scanner while the scanner is active.

While active, scan slowly over the desired area to remove the unwanted data. In some cases, rotating over the surfaces will assist in data removal.



Generate Model

Click the bottom button on the scanner, click the **Generate Model** button, or press **M** on the keyboard to create the 3D model. If you exit without generating the model, the scans will be lost.

Click **Data Density View** to evaluate the model for low data. See “Checking Your Model For Missing Data” on page 29 for more information.

For design purposes, you may want to acquire more details of the adjacent teeth.

Checking Your Model For Missing Data

Data Density View

Click **Data Density View** to evaluate the model for low data.

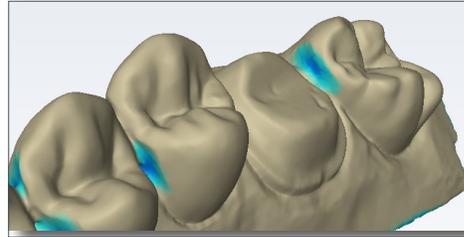
- 1 Click **Data Density View** if it is not already activated. The model refreshes with the dark blue and purple areas indicating the least data. Rotate the model to analyze it.
- 2 Dark areas on your restoration site and interproximal contact areas should be rescanned.



Look for colored areas on the prepared tooth, especially on the margin. The adjacent teeth should have good data on the interproximal contact area, occlusal surfaces, and of the lingual and buccal contours. Data below the height of contour is not as crucial on the adjacent teeth.



ICE View with Data Density activated



Stone View with Data Density activated

- 3 If areas lack detail, take additional scans.

With a little additional scanning, the example is greatly improved.



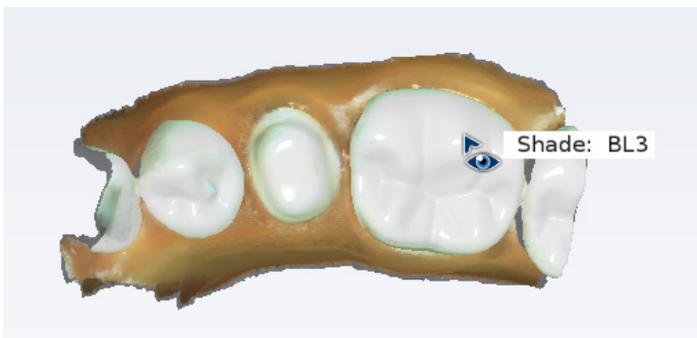
- 4 Click **Data Density View** again to return to the normal view.
- 5 Click the **Margin** screen or click the **Next** button when finished with scanning.

Shade Assist

For intraoral cases only. Planmeca Emerald S only.

Use **View ICE Preparation** to toggle between ICE view and stone view.

Hover over the dentition to see a shade popup.



Reset Model

Click the **Undo Erase** button to reset the model if a mistake was made when erasing.



Delete Model

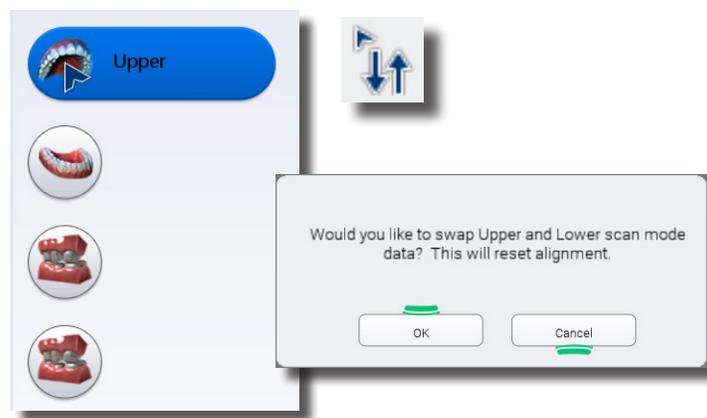
Click the **Delete Data** button to remove the model and start over.



Scan Swap

If you accidentally scan a model under the wrong scan type, it can be transferred to the correct type.

- Right-click and hold on the scan type icon. The mouse cursor changes to up and down arrows.
- Drag the cursor to the desired Scan Type and release the mouse button.
- A message similar to the following appears: "Would you like to swap upper and lower scan mode data? This will reset alignment." Click OK to complete the swap. The message varies depending on which scan models are being swapped.



Scanning Upper and Lower

For restoration scans:

- Start on the occlusal for both scans.
- When your restoration tooth numbers cross the midline, start the scans with the scanner pointing towards the distal of the highest tooth number. Start the scans of the opposing arch in the same direction.
- Ensure you have good data on the margin, occlusion, and interproximal contacts
- Ensure there is enough buccal data to aid in alignment

For diagnostic scans:

- Start on the occlusal for both scans.
- If you start scanning the upper on the patient's left, then you should start scanning the lower on the left. The models cannot automatically align if they are started in different orientations.
- Ensure there is enough buccal data to aid in alignment

Time Saver

The system allows you to use a Time Saver method of copying the model. In certain scenarios, this enables you to duplicate a model under another heading. You can then erase the data that needs to be replaced and take fewer scans than if you are doing a completely new scan.

- Pre-op model can be copied into the Upper or Lower (based on selected tooth number)
- Upper or Lower (based on selected tooth number) can be copied into Bite Registration

The Pre-op and Bite Registration instructions in this manual assume that you will use the Time Saver method. You always have the option of simply doing a full scan for each model type.

Scanning Buccal

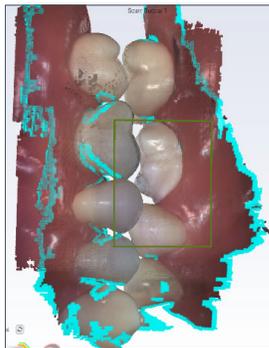
The buccal bite is scanned to align upper and lower models. While scanning the buccal, the Upper and Lower model will automatically appear in the model build view.



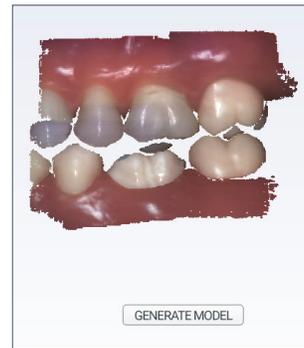
- 1 Click **Scan Buccal**.
- 2 Press the articulated model down firmly or have the patient bite down firmly and tell them not to move while you are scanning. If they shift during the scanning, the alignment may be incorrect.
- 3 Scan at a 90° angle to the teeth. Focus the scanning on one arch until the model for that arch appears, then go to the opposing arch and repeat.

If the models do not automatically appear for each arch, scan the desired teeth and then manually align them with the Bite Alignment tool.

- 4 Scan the sides of the teeth that were captured in the upper and lower models. Ensure some gingival data is captured.

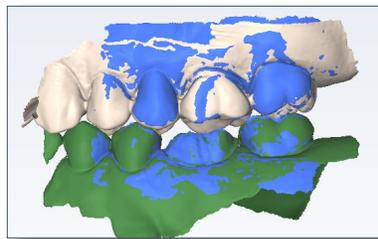


*During scanning:
Upper and Lower models appear with a notification
noise and blue edges if automatically aligned.*



*After scanning:
The buccal model shows the amount that
was actually scanned before it is generated.*

- 5 Erase any excess data from the model.
- 6 Click the bottom button on the scanner, click the **Generate Model** button, or press **M** on the keyboard. If the Align Buccal is red, see "Model Alignment" on page 35 for instructions on manually aligning the data.



*After model generation:
If the models were automatically aligned, all 3 are shown.
Otherwise, the buccal model is shown in blue.*

7 Click **Refine Bite** if desired. (Unavailable if the models are not aligned)



Bilateral Buccal Bite

Full mouth cases may require additional refinement and bite scans. You can use the Buccal 2 scan type to scan a second bite. Scan Buccal 2 and refine if needed.

Basic Buccal Bite Workflow:

- Scan Buccal 1
- Refine
- Verify alignment

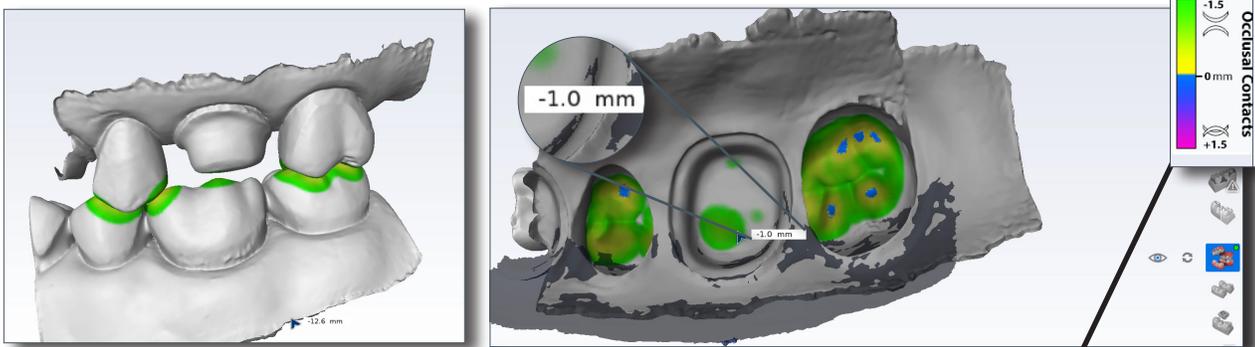
If needed:

- Scan Buccal 2
- Refine

Prep Clearance and Contact Strength

Prep Clearance displays the distance to the opposing dentition just by moving over the prep with your mouse.

While in the Bite Align tool, rotate the model to view the prep. Use the mouse pointer to hover over the area. A distance indicator (in mm) appears as you move around the model. The Occlusal Contacts heat map in the Bite Alignment tool displays intensity of the bite or distance to the opposing dentition.



Use the Occlusal Contacts legend to assist in bite intensity and clearance.

Scanning a Bite Registration

A bite registration can be used to optimize occlusion for proper alignment with the opposing tooth. Scan the preparation, ensuring there is enough detail of the adjacent dentition and/or gingival tissue in your preparation scans to align the bite registration scans.

After scanning the preparation, prepare the bite registration.

Bite registration preparation

Keep the following recommendations in mind as you prepare bite registrations:

- 1 Place the bite registration material so that it completely covers the preparation surface.
 - The bite registration material should not cover the adjacent teeth. If it does, trim to the interproximal after the material sets.
 - There must be sufficient data of the adjacent teeth in the scans of the preparation and the bite registration in order for the two models to align.
 - Ensure there are no gaps between the bite registration material and the adjacent teeth.

Have the patient bite down firmly or press the articulated model down firmly for the impression.



- 2 If trimming of the bite is needed to expose more of the adjacent teeth, trim the bite in the mouth. If you remove and replace it, the bite registration material may not seat properly.

Bite registration scanning

Goals

100% occlusal data

- 1 On the Setup screen, select **Bite Registration**.



On the Scan screen, the system defaults to Upper or Lower based on the selected tooth number.

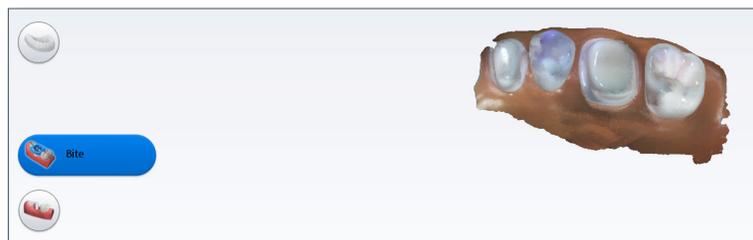
- 2 Scan the preparation model.
- 3 Click **Scan Bite**.

A Time Saver message appears. This message only appears when the preparation is scanned first. The Time Saver option allows you to duplicate the preparation model and use the same data for the bite registration model.

Time Saver cannot be used in conjunction with Impression Mode.

- 4 Click **OK** to use the Time Saver. If you do not wish to use the Time Saver option, the bite registration and adjacent teeth can be scanned on their own. The following instructions assume the use of the Time Saver option.

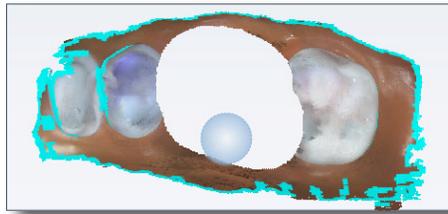
A copy of the preparation model is created as the bite registration model.



- 5 Click the **Eraser Tool**.



- 6 Erase the preparation and the marginal ridges of the adjacent teeth.

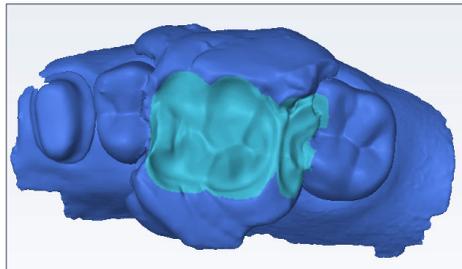


- 7 Click the **Eraser Tool** to deactivate it.
- 8 Activate the scanner and scan begin the scans with the occlusal of one of the adjacent teeth. Once you have established where you are, you can begin scanning the bite registration data.
- 9 Scan the occlusal of the bite registration material and any of the adjacent tooth data that was removed and is not covered by the bite registration.

Selecting the Bite Registration

Highlight the opposing dentition to designate which areas of this model should be used for occlusion.

- 1 Click **Bite Selection** at the bottom of the screen. This icon only appears on the Scan Bite screen.
- 2 Click and drag to highlight the areas of the opposing dentition that would come into contact with the restoration.



- 3 Click **Bite Selection** again to deactivate it.

Deactivate and reactivate the icon if you made a mistake and need to start over.

Model Alignment

The alignment icons are on the right side of the screen. There is a different icon for each alignment type: Buccal Bite, Pre-op, Bite Registration, and Scan Body. The system attempts to automatically align the models as they are generated. A green dot means the scans are aligned. A red dot means they are not aligned.



Click the icon to view the alignment. All of the alignment icons have a Refresh button. Click Refresh to reset the alignment and manually align the models. Automatic alignment should be used in most cases. Full arch mode requires manual alignment.

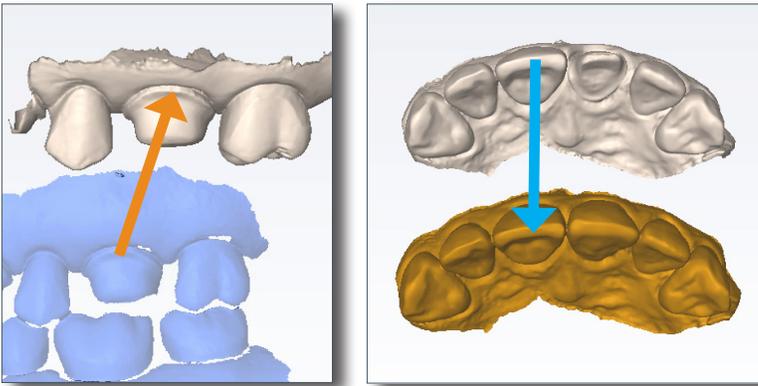


If there is extra data that might be interfering with the scans (tongue, cheek, etc.), try trimming the extra data before manually aligning.

The buccal bite model is translucent on the Alignment screen to aid in evaluation. The buccal bite has an extra Show/Hide Buccal option. This enables you to hide the buccal bite model and evaluate the opposing and prep models.

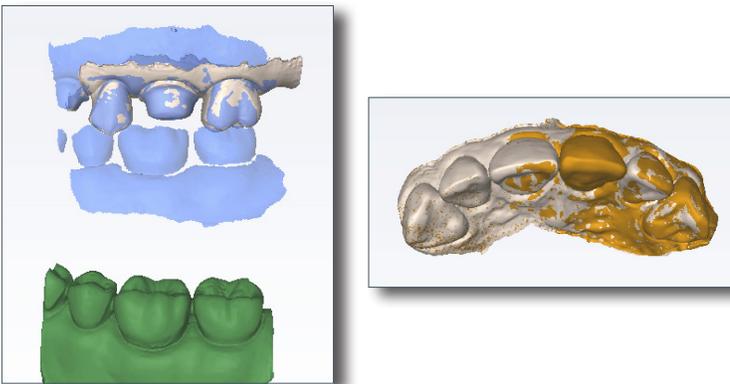


To align models, drag and drop the buccal bite, pre-op, bite registration, or scan body over the prep model.

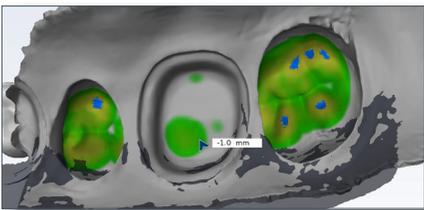


The models will snap into place or will return to their original positions.

In Buccal/Opposing cases, the opposing model appears after the prep and buccal bite are aligned. Click and drag the opposing model to match the buccal bite model.



When the models are aligned, you can rotate to view the amount of contact from above. The amount of contact is shown as a color map.



To access the menu options at the top or to return to scanning, deactivate the selected Alignment icon. You cannot proceed if the Alignment icon is active (blue).



Rotating the Models

When necessary to aid in alignment, you can rotate the buccal bite or opposing model.

The preparation model cannot be rotated, it is always stationary.

With the mouse cursor directly over the buccal or opposing model, right click and drag to rotate.

With the mouse cursor on the background, right click and drag to rotate all of the models at the same time.

Left click and drag to move the models on the screen.

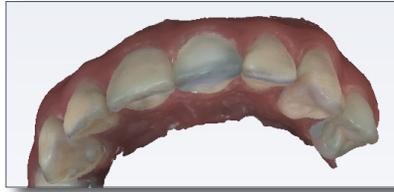
Once the models are in good position in relation to each other, use the steps in the previous section to align the models.

Scanning a Pre-op

Use Scan Pre-op when you want to scan a pre-operative tooth or a wax-up. Pre-op scans can be used in combination with the Library tooth or can be used as a template, like a bite registration.

- 1 On the Scan screen, click **Scan Pre-Op**.

Scan the pre-operative tooth or wax-up and adjacent teeth.



- 2 Prepare the tooth.
- 3 On the Scan screen, click the arch with the preparation.

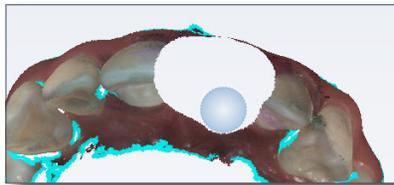
A Time Saver message appears. This message only appears when the pre-op is scanned first. The Time Saver option allows you to duplicate the pre-op model and use the same data for the preparation model.

Time Saver cannot be used in conjunction with Impression Mode.

- 4 Click **OK** to use the Time Saver. If you do not wish to use the Time Saver option, the preparation and adjacent teeth can be scanned on their own. The following instructions assume the use of the Time Saver option.

A copy of the pre-op model is created as the preparation model.

- 5 Click the **Eraser Tool**.
- 6 Erase the tooth that has been prepared and the marginal ridges of the adjacent teeth.

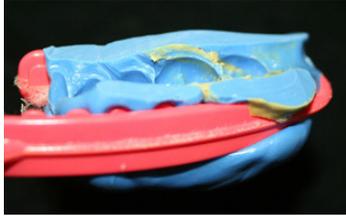


- 7 Click the **Eraser Tool** to deactivate it.
- 8 Activate the scanner and begin the scans with the occlusal of one of the adjacent teeth. Once you have established where you are, you can begin scanning the preparation.
- 9 Scan the entire preparation and any of the adjacent tooth data that was removed.
- 10 Click the bottom button on the scanner, click the **Generate Model** button, or press **M** on the keyboard.



Scanning Impressions

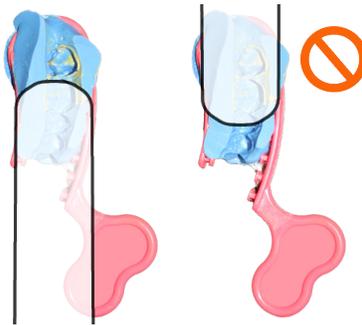
Remove the excess impression material so that the scanner can get closer for scanning.



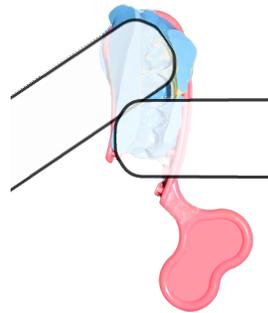
Any impression material can be used. The system does not require a particular color or type of material.

Positioning the Scanner

When scanning the impression, ensure the tip of the scanner is pointing towards the distal for the initial scans so that the orientation of the model is correct.



Due to the nature of impressions, the normal positioning of the scanner may not be able to capture all of the walls of the impression. You can also tilt the scanner up or down or turn the scanner perpendicular to the impression to achieve the necessary point of view.



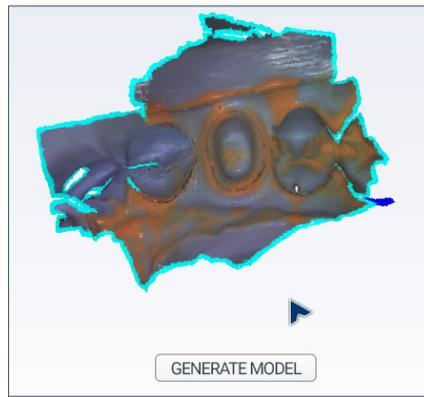
Scanning the Impression

Ensure the scanner is positioned correctly. See above for positioning. Be careful not to squeeze or otherwise distort the impression while scanning.

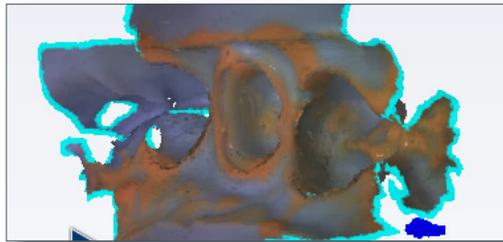
On the Scan screen, the preparation's arch is selected. Do NOT select Scan Bite Registration, which resembles an impression.

- 1 Scan the impression.
- 2 Evaluate the model for low data.

Note that from the occlusal view, the impression can give the optical illusion of looking like a regular model.



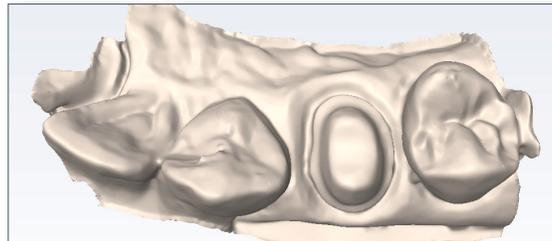
- 3 Rotate the model to see all of the impression. Be sure to check the contact areas on the adjacent teeth.



- 4 If there are areas that need additional scans, such as the interproximal area shown above, take extra scans.
- 5 Erase any extra data.
- 6 Click **Impression Mode** to invert the model into the normal view. All other screens will use the inverted model of the impression for creating the proposal.



*A message appears; "Inverting the impression model will reset associated margins and restorations. Are you sure?"
Click Yes to invert the model.*



- 7 Click the **Margin** screen and continue with the normal procedure for drawing the margin and designing the proposal.

Non-Restorative and Full Arch Scanning

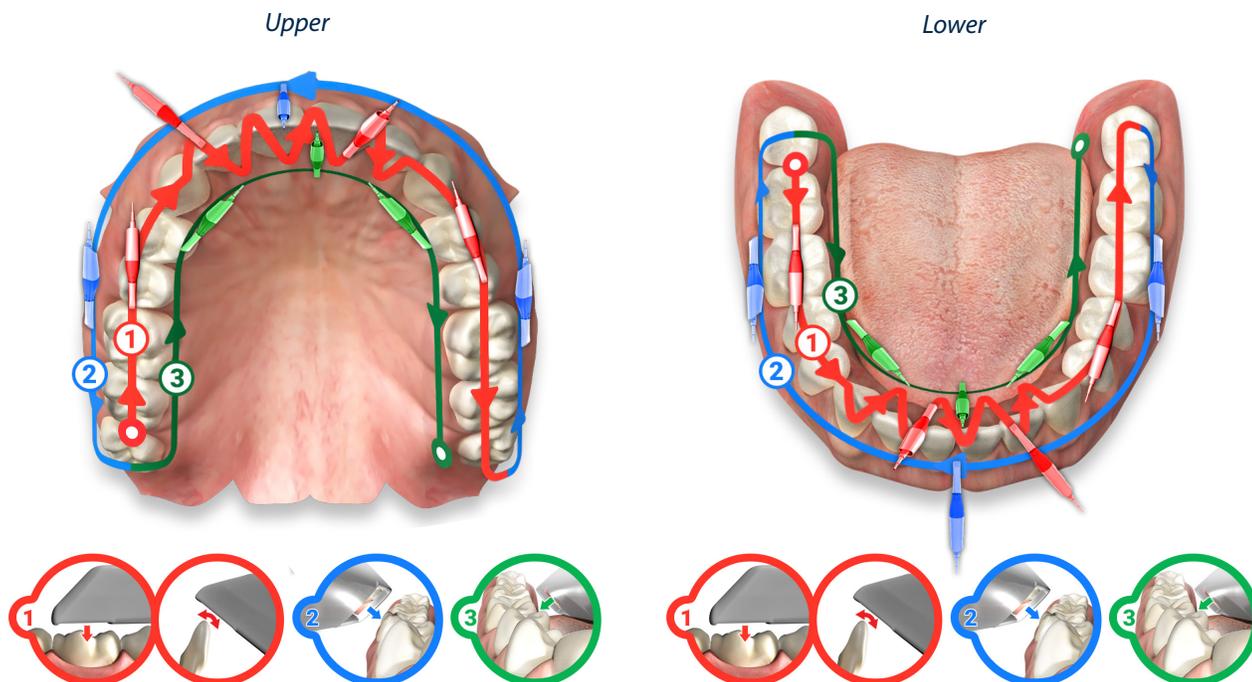
For diagnostic cases, orthodontic aligners, or when sending a large restorative case (without drawing margins) to a laboratory, select Non-Restorative as the restoration type on the Setup screen and click Scan to proceed.

Non-Restorative scanning is different than restorative scans in several ways:

- Setup screen information is not entered.
- Export only - PlanCAD and PlanMill not available
- No margins are drawn. If you are scanning a large restorative case and sending it to a lab, ensure the margins are visible without the need for the Retract tool.
- Buccal scanning - double buccal is enabled. Scan the molars on each side to get accurate alignment.

Use the method on the following pages when using Full Arch scans for the fabrication of appliances. Failure to capture using this method may result in less accuracy.

Full Arch Scanning Pattern



- 1 Start on the distal of one side, scan the occlusal of the entire arch. On the anteriors, rotate back and forth from the lingual and facial.
- 2 Scan all of buccal.
- 3 Scan all of the lingual.
- 4 Evaluate the model and rescan any low data areas.
- 5 To aid automatic alignment, start the scans on opposing molars and begin the buccal can in the same quadrant.

Open Bite Scan

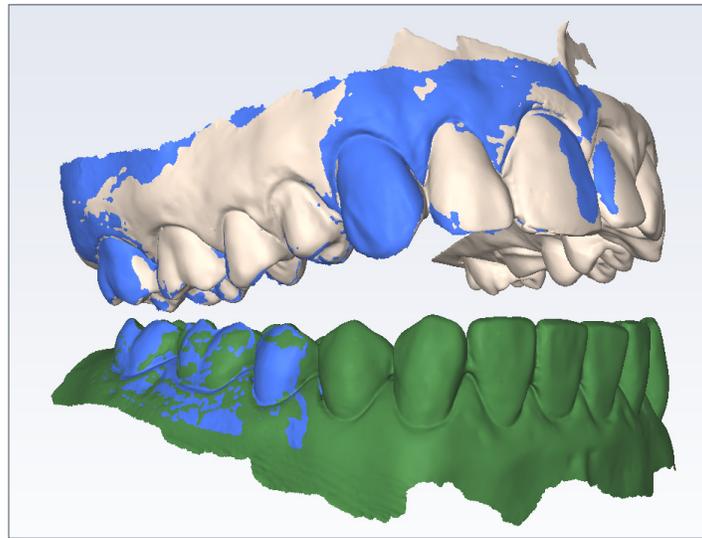
Open Bite is used for sending data to your lab for a night guard and other such appliances.

- 1 Select **Open Bite** on the Setup tab.



- 2 Scan the Upper and Lower arches following the normal workflow.
- 3 Have the patient bite on the bite registration appliance of your choice.
- 4 Scan the buccal bite with the patient partially open.

The system attempts to align the models automatically. Manually align them if needed.



Scan Body Workflow

For United States users, the Scan Body scan type is for export cases only.

- 1 After removing the healing cap, the soft tissue (where implant is placed) is scanned in as the preparation model.



- 2 Scan the opposing and buccal bite.
- 3 Insert the scan body and scan it under the Scan Body scan type.

- 4 Scan pattern: Start the scanning at the **gingival** in order to capture enough data. When possible, include teeth and tissue in the scans. Scan up the side, over the top of the scan body, and back down until you reach the gingival again. Scan the rest of the model with the scanner's normal scan pattern.
- Try and get as close as possible to the scan body, but do not put it inside of the tip.
 - Do not use Active Delete
 - Use the larger tip size because of the bigger field of view to aid in alignment



If you start scanning from the occlusal on a scan body, you will not capture enough data and it is difficult to create a good model. Start scanning from the gingival in order to start with good data.

- 5 Verify alignment.
- 6 Follow the normal procedure for exporting the case to your laboratory. See your scanner's user manual for more information.

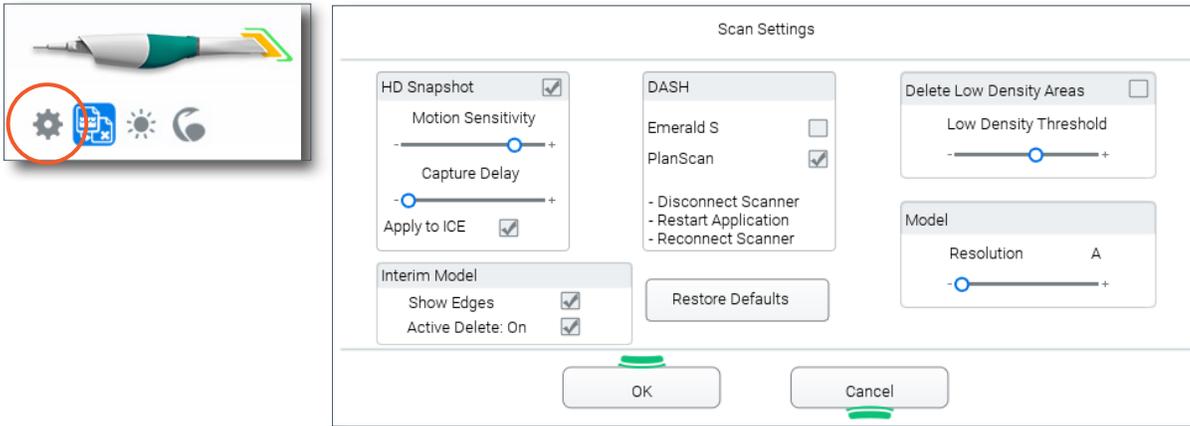
360° Scanning

You can scan the underside of an appliance to send to a laboratory. The example below is of a denture that has been scanned into the Upper scan mode. These pictures are of one model.



Scanner Settings

Click the Scan Settings icon to view/change settings



HD Snapshot

Press and hold the bottom button or hover over an area to take a high definition snapshot. Press/Hover until you hear the shutter sound, which indicates that the picture has been taken. See “Saving a Live Scan Image” on page 26 for information on how to find the snapshot in the patient’s file.

- The Motion Sensitivity slider adjusts how affected this function is by movement of the camera.
- The Capture Delay slider adjusts how long you have to stay still to take the snapshot.
- Apply to ICE adds the HD picture onto the ICE view of the model

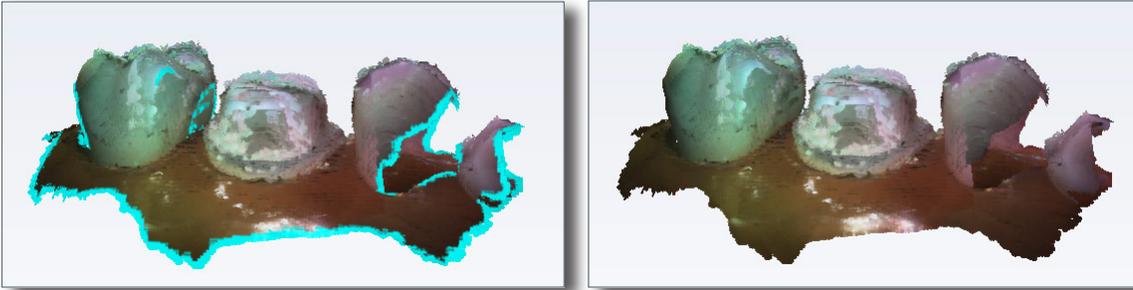


HD Snapshot applied to ICE

Hovering can also be used to remove unwanted data with the Active Delete feature. If both features are active, you may end up with more snapshots added to the model than intended. In this scenario, it may be advisable to deactivate the Apply to ICE option or to delete the model and rescan so that the Active Delete is not necessary.

Show Edges

The Interim Model is what you see while scanning and before the model is generated. Deselect Show Edges to remove the blue highlight on the edges. The blue highlighting can aid in finding low data areas before the model is generated.



DASH

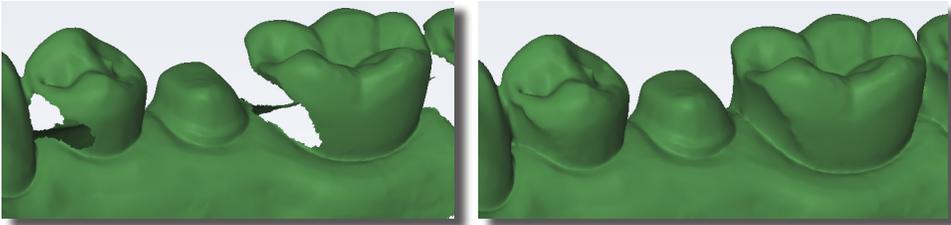
Narrows the field of view and speeds up the processing rate of the Planmeca Emerald S or Planmeca PlanScan. Does not affect the Emerald scanner. When activating or deactivating DASH, you must disconnect the scanner, restart the application, and then reconnect the scanner before the change will take effect.

Active Delete ON/OFF

The default setting for Active Delete is to be turned OFF. Select it to change the default setting to ON.

Delete Low Density Areas

Use this feature when your laboratory has requested for low data to be removed. The Delete Low Density Areas setting allows the user to adjust the automatic fill of low density data within the generated model. Use the slider to increase and decrease the level of data that should be shown on the model.

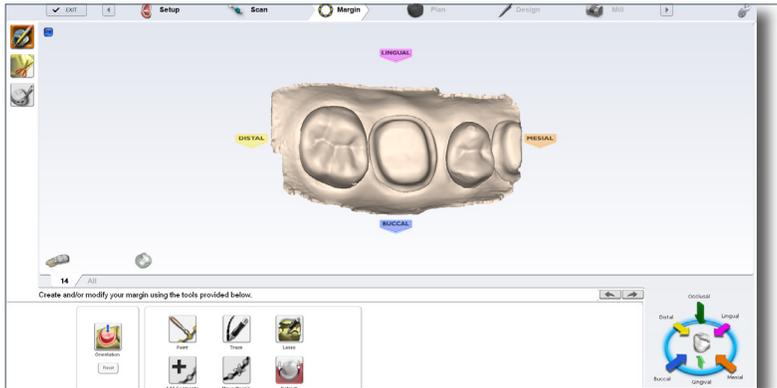


Model Resolution

To sharpen the model detail, move the Resolution slider in Scan Settings to the right. Model generation times can increase dramatically with D & E Resolutions.

Margin Tab

The Margin tab contains tools for quickly and easily creating and modifying the margin.



There are three tools on the Margin tab.

- Margin Tool
- Selection Area Tool
- Pre-op Editing Tool

Margin Tool

Clicking the **Margin Tool** activates the margin editing mode in which various methods are available to create and edit the margin.



There are three aids available when working with the margin:

- View ICE Preparation
- Show Features
- Toggle Margin

There are three options for creating your margin:

- Paint - Create the margin using a broad brush stroke.
- Trace - Create the margin using individually marked points along the edge.
- Lasso - Create the margin by marking several points along the edge

You can zoom and rotate the model while you are creating or editing the margin.



After the margin is created, it can be edited using one or both of the following:

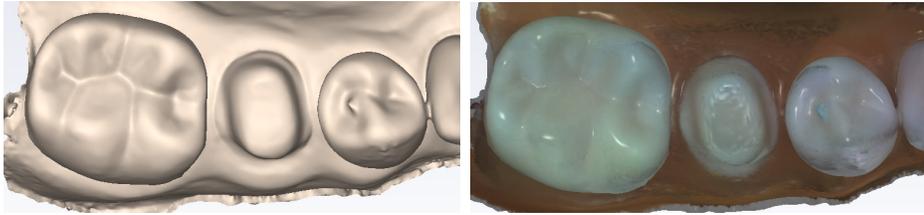
- Add Segments - Replaces existing segments of the margin.
- Move Margin - Adjusts the curve of the existing margin.

Margin Aids

View ICE Preparation

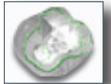
For intraoral cases only.

Use **View ICE Preparation** to toggle between ICE view and stone view.



Show Features

Click **Show Features** to highlight high contour areas in green. This can be helpful in finding the margin edge on supragingival preps, inlays, and onlays.



Creating the Margin

When creating the margin, use either the Paint, Trace, OR Lasso tool. They are not used in combination.

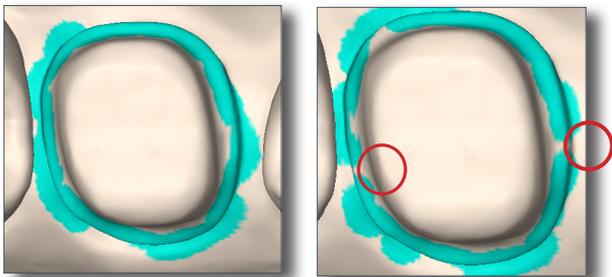
Paint tool

The Paint tool is recommended for supragingival margins.

- 1 Click the **Paint** tool.

The pointer changes to  .

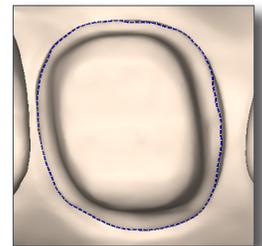
- 2 Hold down the mouse button and drag the Paint tool around the scanned prep to highlight the outer margin edge. The margin doesn't have to be perfect, but gaps must be avoided.



- 3 Click the **Paint** button again.

The system automatically draws the margin.

- 4 To delete the margin and start over, click the **Paint**, **Trace**, or **Lasso** button.



Trace tool

The Trace tool can be used on any margin, but it is especially recommended for equigingival and subgingival margins.

- 1 Click the **Trace** button.

The pointer changes to  .



- 2 Click **Show Features** to highlight high contour areas in green.

- 3 Zoom in and rotate the model until there is a good view of the margin.

- 4 Position the Trace tool in the middle of the green high contour indication on the margin.



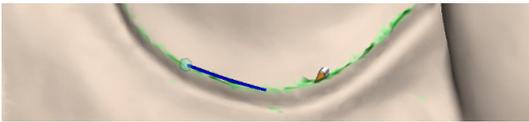
*Show Features is recommended as an aid in finding the edge of the margin, it is not necessary for using the Trace tool.
Draw the margin in the middle of the green high contour indication.*

- 5 Click on the margin. A dot appears as the starting point.

- 6 There are two options when drawing the margin with Trace.

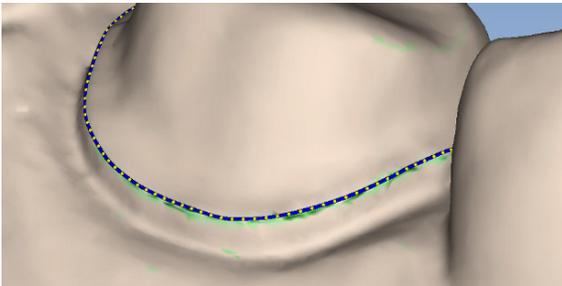
- Click along the margin in small increments. The system creates straight lines between each click.
- Hold down the left mouse button to draw a continuous line. Release the mouse at any time to stop. This requires a steady drawing hand with the mouse and is not recommended for beginners.

If desired, switch between small clicks and continuous lines.



- 7 Click the starting point to finish the margin. The system automatically changes the trace line to a margin line.

Your margin should resemble the following.



- 8 To delete the margin and start over, click the **Paint**, **Trace**, or **Lasso** button.

Lasso tool

The Lasso tool is recommended for partial restorations and supragingival margins with a sharp edge.

- 1 Click the **Lasso** button.

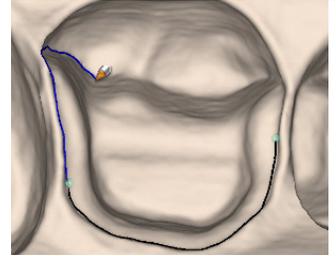
The pointer changes to .

- 2 Click along the margin at large intervals. The system creates a line along the edge between each click.

The starting point and the most recent point clicked appear as blue dots.

- 3 Click to accept the previewed segment. Click the starting blue dot to finish the margin.
- 4 To delete the margin and start over, click the **Paint, Trace, or Lasso** button.

If Lasso is having trouble finding the margin, you can change the ICE Margin Mode to Texture Only. See below.



Margin Tab Settings

ICE Margin Mode

For intraoral cases only.

ICE Margin Mode determines which view the system uses to create the margin curve when using the Lasso tool.

- 1 Click **Settings**.
- 2 Click **ICE Margin Mode**.

The default setting, **Normal**, means that the system uses both the stone and ICE view to determine where the Lasso line should appear.

- 3 Select **Texture only** to indicate that the system should ignore the stone model and focus on the differences in the ICE view. If **View ICE Preparation** is deactivated, this setting returns to Normal mode.
- 4 Click **Save** to save the change or **Cancel** to exit without saving.



Modifying the Margin

The Margin tab provides two tools for modifying an existing margin path: Move Margin and Add Segments.

Before selecting a tool, enlarge and position the model to ensure an optimal view of the margin area. You can use either tool or both sequentially, they do not remove previous changes when clicked like the margin drawing tools.

Toggle Margin

Once the margin is created, **Toggle Margin** shows or hides the margin. This is helpful in verifying the margin has been drawn correctly.



Move Margin tool

Use the Move Margin tool to drag and drop a section of the margin into a new position.



- 1 Click the **Move Margin** button.
- 2 Position the pointer on the margin; click and hold down the mouse button.

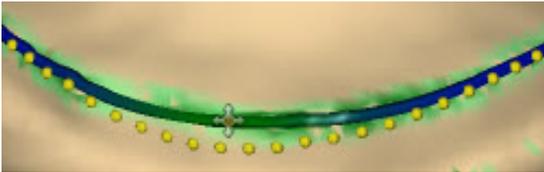
Area of Influence - Change the tool's area of influence by dragging the yellow button to increase or decrease the size of the ellipse.



- 3 Drag the margin onto the margin shelf and release the mouse button.

The system automatically redraws the margin in the new location.

- 4 Repeat as needed.

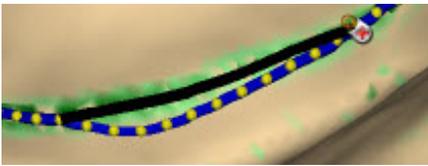


Add Segments tool

Use the Add Segments tool to redraw a portion of the margin.



- 1 Click the **Add Segments** button.
- 2 Start by clicking on a portion of the margin line that is acceptable. Then, click to add new points across the gap in the line. A line traces where you click. Use multiple clicks to create a curve.



- 3 Click **Add Segments**. The system redraws the margin and removes the unacceptable section.
- 4 Repeat as needed.

Retract

Use the Retract tool on STL export cases with a subgingival or equigingival margin. This tool ditches the 3D model since the margin line does not convert to STL.

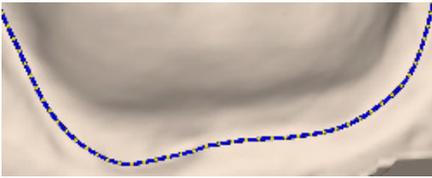
ICE View is not converted to STL format and cannot be used as a visual aid by the recipient of your case.

Without virtual ditching, the margin may be difficult for your recipient to see.



- 1 After the margin has been drawn and edited, click **Retract**.

The system virtually removes part of the model outside of the drawn margin.



Margin drawn - No ditching



Margin drawn - With ditching

Any changes to the margin will require the ditching to be redone. If you are doing a multiple restoration case, finish all of the margin edits before using the Retract tool.

- 2 Click **Toggle Margin** to view the ditched area without the margin. This is similar to what your STL recipient will see.



- 3 Click **Toggle Retraction** to show/hide the virtual ditching.



Multiple Restorations

On multiple restoration cases, the tooth number is assigned to each preparation when the margin is drawn.

- 1 Click the desired tooth number tab.



- 2 Draw and edit the margin for the selected tooth number.
- 3 Select the next tooth number.
- 4 Draw and edit the margin for the selected tooth number.

Drawing the margins is how the tooth number is designated for each preparation. If the wrong tooth number is selected when a margin is drawn, the margin must be marked again on the correct tooth tab.

Drawing Pontic Margins

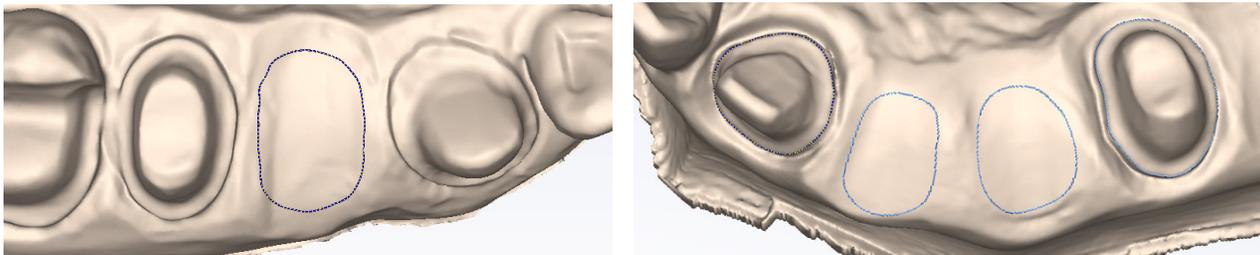
A margin is drawn for each tooth in the bridge.

- 1 Click the tooth number tab for each abutment and draw the margin on the selected tooth.

An edentulous space does not technically have a margin. The margin is drawn to aid the design process.

- 2 Click **Trace** and designate the position and extension of the base of the pontic on the gingival tissue to fit the appropriate contour.

Do not go too far down the curve of the gingival tissue or you may not be able to fit the bridge in the block.



Selection Area Tool

For designing systems only. See the PlanCAD User Manual for more information.

Edit Pre-Op Tool

For designing systems only. See the PlanCAD User Manual for more information.

Exporting Data

The screenshots in this chapter are for Romexis and may have changed since this manual was published. Please see the Romexis User Manual or www.planmeca.com for more information on Romexis.

There are several methods for sharing digital information using Romexis.

- **CAD/CAM** cases can be transferred between other Planmeca or E4D systems.
- STL files of CAD/CAM data can be exported as **3D Models** to and from an external source.
- View images on an iOS device with **iRomexis** installed. See Romexis manual for more information.
- Securely send cases over the internet using **Planmeca Romexis Cloud** services (see Romexis manual) or send to a lab through **DDX**.

Exporting a CAD/CAM Case

- 1 To export a file to share with another Planmeca system, click **File - Export - Export CAD/CAM Case**.
- 2 Select the destination folder and enter a file name. Click **Save**.

Exporting 3D Models

3D Model Export

To export 3D models in STL format click the case in the Patient's Case Files list then **3D model export**.



- 1 Navigate to the desired destination folder. It is recommended to create a new folder on the desktop to easily find the files later.
- 2 Click **Save**

For equigingival or subgingival margins, ensure you have used the Retract margin tool. The drawn margin is not saved and the STL recipient will not be able to use ICE View to find the margin. See "Retract" in the Margin chapter.

DDX Export

To send CAD/CAM or STL models via the DDX network to registered DDX Labs. See Romexis User Manual for configuration instructions.

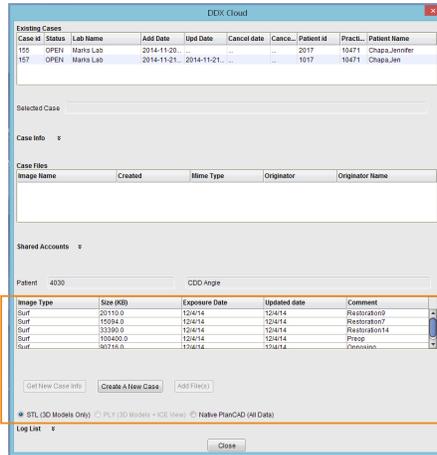
The recipient can import the STL files or the entire cad/cam case if they have our design software.

Sending Cases Through DDX

- 1 In the **CAD/CAM** module of the active patient, select the desired case file.
- 2 Click **DDX Export**.

If you are currently logged into DDX, you will see details of your other cases.

The available models for the case that you have selected are listed near the bottom of the screen. Ensure you have a ditched_prep model if your case has equigingival or subgingival margins. See *“Retract” in the Margin chapter* for more information.



- 3 Select **STL (3D Models Only)** or **Native PlanCAD (All Data)** as the export type at the bottom of the screen. Labs must have Romexis PlanCAD software in order to use the PlanCAD data. Ask your lab which export type they prefer.
- 4 Click **Create a New Case**.

If you are not already logged into DDX, a login screen will appear.

- 5 Select the desired lab from the list of **My Labs** or **Find A Lab**.
- 6 Fill out the form. You must select a **Procedure** and type the **tooth number(s)**. The rest of the fields are optional.
- 7 Click **Submit Case**.

The system returns to the DDX Cloud screen. Wait for the case to appear in the Existing Files section.

A red progress bar appears when the case automatically uploads. The screen closes when the upload is finished.

If the case does not automatically upload, click on the file in Existing Files and click the Add Files button.

A PlanScan panel is available in the Dextrix Chart. See Dextrix user manual for details and instructions.

Planmeca Emerald S Specifications



EMERGO EUROPE
Prinsessegracht 20
2514 AP The Hague
The Netherlands



D4D Technologies LLC
2920 Telecom Parkway Ste 100
Richardson, TX 75082 USA

Model Number: Planmeca Emerald

P/N: 15610003

Electrical Ratings: 5Vdc,

Storage conditions: -20°C to 60°C (-4°F to 140°F)

Operating conditions:

15 °C to 28 °C (59 °F to 82 °F)

5%-95% non-condensing relative humidity

Environmental pressure range 0.74 atm - 1.05atm (75.3 kPa - 106.6 kPa)

Dimensions:

Scanner with tip - 1.6 x 1.8 x 9.8 inches (41 x 45 x 249 mm)

Scanner without tip - 1.6 x 1.8 x 6.5 inches (40.5 x 45 x 165 mm)

Scanner tip - 0.96 x 0.96 x 3.5 inches (24.6 x 24.6 x 88.6 mm)

Approximate Weight:

Scanner with tip and cable - 11.97 oz (339 g)

Scanner base - 7.51 oz (213 g)

Scanner tip - 0.60 oz (17 g)

Scanner cable - 3.86 oz (109 g)

Applied Part

The scanning tip is the only applied part.

Cables

When connecting components, ensure you use only the cables provided with the system.

Applicable Standards

Product Safety

ANSI/AAMI ES60601

IEC 60601-1, 3rd Edition

EMC

IEC 60601-1-2

US FCC CFR 47, Part 15B

Laser Product Safety

IEC 60825-1:2014, 3rd Edition



Packaging and Environmental

ISTA Class 2A

Biocompatibility

ISO 10993

European Standards

93/42/EEC Medical Device Directive
EN 60601-1:2006 Safety of Medical Electric Equipment
EN 60601-1-2 Electromagnetic Compatibility
EN 60825-1 Safety of Laser Products
EN ISO 14971:2012 Risk Management
EN ISO 13485 Quality Management Systems
EN ISO 10993: Biological Evaluation of Medical Devices

Canadian Standards

CAN/CSA C22.2 No. 60601
SOR-98-282 Canada Medical Device Regulations
ICES-001 ISM Radio Frequency Generators

US Food and Drug Administration

US FDA CFR 21 Part 1040.10 Laser Products
US FDA Laser Notice 50
CFR 21, Part 820
FDA Class II Special Controls for Computer Assisted Design and Manufacturing of Dental Restorations

International Standards

ISO 14971:2007
ISO 13485:2003

Approvals (All Systems)

North America	Product Safety Mark (NRTL) - UL C/US
International	CB Scheme Product Safety Test Certificate (UL)
	CB Scheme EMC Test Certificate (INTERTEK)
	CE Mark (TUV)
	CB Scheme Laser Product Test Certificate (TUV)
Quality System Certifications	ISO 13485 Registered Firm

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 and conformance with IEC 60825-1 Ed. 3 and IEC 60601-2-22 Ed. 3.1, as described in Laser Notice No. 56, dated May 8, 2019.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This ISM device complies with Canadian ICES-001. (Cet appareil ISM est conforme à la norme NMB-001 du Canada.)

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Guidance and Manufacturer's Declaration - Electromagnetic Emissions

The Emerald is intended for use in the electromagnetic environment specified below. The customer or the user of the Emerald should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - guidance
RF emissions CISPR 11	Group 1	The Emerald uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Emerald is suitable for use in all establishments other than domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The Emerald is intended for use in the electromagnetic environment specified below. The customer or the user of the Emerald should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	+/- 8 kV contact	+/- 8 kV contact	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
	+/- 15 kV air	+/- 15 kV air	
Electrical fast transient / burst IEC 61000-4-4	+/- 2 kV for power supply lines +/- 1 kV for input/output	Not applicable	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5	+/- 1 kV differential mode	Not applicable	Mains power quality should be that of a typical commercial or hospital environment
	+/- 2 kV common mode		
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% Ut (>95% dip in Ut)for 0,5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut)for 5 sec.	Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60 Hz) Magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: Ut is the a.c. mains voltage prior to application of the test level.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	Not applicable	Portable and mobile RF communications equipment should be used no closer to any part of the Emerald, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.7 GHz	3 V/m	

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Emerald is used exceeds the applicable RF compliance level above, the Emerald should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Emerald.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended Separation Distances

WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Planmeca Emerald, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Emerald Optical Specifications

Caution Using controls, making adjustments, or performing procedures in a manner other than is specified in this documentation may result in hazardous radiation exposure.

Laser Class ^a	Class 2
Output	7.7mW
Wavelength Range	400 - 700 nm
Beam divergence	10 degrees

a. Laser product classified to standard IEC/EN 60825-1:2014 Ed. 3.0

The scanner's laser projection system utilizes a divergent beam powered by a non-accessible laser source with a maximum power output of 200 mW. The scanner incorporates design features that prevent exposure to any hazardous levels of laser radiation in normal operation modes and in any reasonable fault conditions.

Labels

Symbols

The following symbols are used on various labels on the system.

Symbol	Definition
	Authorized Representative in the European community
	Class 2 electrical product
	Date of Manufacture
	DC Current
	This product must NOT be disposed of with other waste. It is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to Planmeca for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or Planmeca.
	European conformity
	General mandatory action
	General warning
	Laser warning
	Lot number
	Mandatory Safety ISO 7010-M002

Symbol	Definition
	Manufacturer
	Catalog number
	Serial number
	Standby IEC 60417-5010
	Type B Applied Part IEC 60417-5840

Product Identification Labels

Affixed to the scanner are product identification labels that contain identification and safety information. Be certain to read all product labeling.

If any of the labels are missing or illegible, please contact Planmeca Customer Support for replacement labels.

The labels may have changed since this book was published.



External Components and Connectors

When connecting external components to the system, attach only devices that have an appropriate NRTL mark for compliance with IEC 60601-1 or IEC 60950.

Connectors for attaching external devices conduct low voltages. Avoid touching the connector pins.

UL Listing

UL Medical Equipment Listing

MEDICAL - GENERAL MEDICAL EQUIPMENT

AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY

IN ACCORDANCE WITH ANSI/AAMI ES60601-1 (2005)

CAN/CSA C22.2 No. 60601-1:2008

EN 60601-1 (2006)

IEC 60601-1-2

IEC 60825-1

30SD



Troubleshooting/Repair

If you have questions, please contact Customer Support at

Toll Free	800-537-6070
E-mail	customersupport@planmecausa.com
Hours of Operation	7 am – 6 pm CT (Monday - Friday)
Web site	www.planmeca.com
Mailing Address	Planmeca USA 2600 Forbs Ave Hoffman Estate, Illinois 60192 USA

Symptom	Probable Cause	Corrective Action
No power	Power cable unplugged	Verify power cable is plugged into a live AC outlet.
	Outer power supply switch turned OFF	Set power supply rocker switch at rear of the unit to "ON" position.
	Inner power supply switch turned OFF	Ensure switch on power supply is turned ON. (Call Customer Support)
Login screen appears	Screensaver login turned ON	Go to properties, then screen saver and turn it OFF.
Failing to send restoration		Call Customer Support.
Software freezing	Low memory	Re-start application or re-start system.
Mouse not responding	Low batteries	Replace batteries.
	Loose mouse dongle	Ensure dongle is plugged into a USB port.

Case Backup

Your patient and scan data is backed up automatically on the hard drive. If something happens give us a call at (800) 537-6070. We'll be able to recover the scan data. Recovery not guaranteed.