# GETTING TO KNOW YOUR

PLANMECA | PlanScan
E4D TECHNOLOGIES

**Watch the included DVD, as many times as you want!**

**Read and share this PlanScan Guide with your team.**

**Go to www.e4d.com for more valuable information.**

**Ask questions! Email our team at education@e4d.com**

# GETTING TO KNOW YOUR PLANSCAN

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Questions? Call E4D Customer Support 800.537.6070 or e-mail customersupport@e4d.com

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E4D TECHNOLOGIES

Welcome to the PlanScan CAD/CAM system and a new era in digital dentistry!

E4D's recent partnership with Planmeca opens the door to unparalleled communication and coordination within the office and among dental and laboratory professionals and specialists. Integrated digital 2D and 3D solutions for specialized treatment planning of implants, endo, and orthodontics are now possible with the powerful Romexis image management software.

PlanScan, PlanCAD, and PlanMill – all powered by E4D Technologies – comprise the Romexis CAD/CAM module.

If you are new to CAD/CAM, the plug-and-play convenience, portability, and fast video-rate data capture combined with easy design customization and micron-accurate milling, provide efficient in-office restorative capabilities without compromise.

If you are upgrading from a previous E4D or NEVO version, then the options for importing and superimposing soft tissue images with crown design and CBCT data as well as 3D tools for orthodontic and dental labs offer exciting new possibilities.

Regardless of your starting point, I am confident that the PlanScan CAD/CAM system will be an outstanding addition to your practice and bring a whole new level of satisfaction to you, your team, and your patients. Enjoy your E4D PlanScan experience!

Gary Severance, DDS
Chief Marketing Officer
E4D Technologies

# Table of Contents

# WHAT YOU SHOULD KNOW

**Quick view tabs, pick the sections that best fit you!**

An in-depth look at the system hardware, the components, and Windows 8.1 basics.

New to Romexis? Learn about the changed icons in PlanScan and PlanCAD.

Video-like scanning and the bridge functionality. (These features were available in versions 4.6 and 5.0)

Parked Jobs option and details for milling Zirlux. (These features were available in versions 4.6 and 5.0)

A group of essential documents that can make your life easier. Copy them, tear them off, or download new ones from www.e4d.com today!

Or pick them all! You'll learn valuable information throughout the whole guide!

# PlanScan System

The PlanScan system includes a plug-and-play scanner and a laptop.


What's New With PlanScan:

- Romexis software interface with optional access to full range of 2D and 3D imaging.
- Patient management in Romexis with search and sorting functions
- Additional import and export options for STL files
- Retract tool for virtual ditching of the 3D model (used in exporting STL cases)

Features Introduced with NEVO:

- Plug-and-play technology - You can now have multiple design stations and move the scanner from one station to another without shutting down the computer.
- The standoff and disposable sleeves have been replaced with solid removable tips. The system comes with three tips which means no down time between patients. Tips require effective high-level disinfection.
- The mirror in the tip is heated to prevent intraoral fogging.
- Convenient ON/OFF button on the wand to start and stop the scanning process.
- Scanning is faster and easier with video-like capture of data. You can watch your model build and move accordingly. Capture full arches and buccal bite cases faster and easier than before.
- New Time Saver functionality - You can copy your pre-op model to create your prep model or you can copy your prep model to create your bite registration model. After the model is copied, you can erase the pre-op or prep and just re-scan that area.
- Full ICE View - The scans are turned into clinically realistic images of the entire model
- New Erase Tool enables you to remove part of the scans. Did you spot a tissue tag or retraction cord covering the margin that needs to be removed? You can fix the problem, erase that spot on the model, and re-scan that area. No need to start over.
- Improved automatic alignment of models
- Bridge capability (also available in version 4.6)

# New Hardware:

PlanScan requires a Windows 8.1 laptop and a scanner.

## New Scanner

The new scanner has a removable tip. Press the green release button (below the scanning window) to separate the tip from the wand. Do NOT just pull on the tip.

Tips are consumable products (approximately 100 high level disinfections) and can be ordered in refills of 3. Tip can be removed and disinfected while the next tip is being used. See below for cleaning instructions on the tip and the system itself.

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



**Disconnected**

**Connected - Cold**

**Tip Disconnected**

**Heating - Stage 1**

**Heating - Stage 2**

**Ready**

### *Cleaning the Scanner Tip*

For intraoral scanning systems only.

The following instructions are for the removable tip of the scanner only and not for the entire scanner. See instructions below for cleaning the base of the scanner.

### Chemical Disinfection:

**Note:** These instructions were validated using MaxiCide Plus w/ Activator (3.4% Gluteraldehyde) disinfectant available from Henry Schein Dental (#102-2865).

**DO NOT Autoclave. DO NOT place in Ultrasonic Cleaner.**

1. Clean the tip for 2 minutes under running tap water at 22 - 25°C (4 liters/minute) to remove debris.
2. Test the potency of your activated MaxiCide Plus prior to disinfection. (Recommend MetriTest Strips by Metrex (HSD #602-3437)
3. Immerse the tip in activated MaxiCide Plus for 120 minutes (2 hours).

**Note:** Do not leave the tips soaking overnight.

4. Remove tip from the disinfectant.
5. Rinse disinfected part in three separate copious amounts of distilled water (1000 ml volume of water; minimum of 2" head height while part is immersed).
6. Agitate the tip in the water for 30 seconds and then let it stand in the water for another 30 seconds.
7. Repeat the agitation and soak in each of the other two containers with fresh distilled water.

### *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.

**Note:** Ensure the tip is dry before connecting it to the base.

Prior to scanning, visually confirm the scanning tip mirror is clean and dry.

- To clean the mirror, use a Kimwipe, 2x2 gauze, or optical cloth with a little alcohol to gently clean the mirror.
- Dry the mirror with a dry Kimwipe, 2x2 gauze, or dry optical cloth.

### *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 PlanScan.

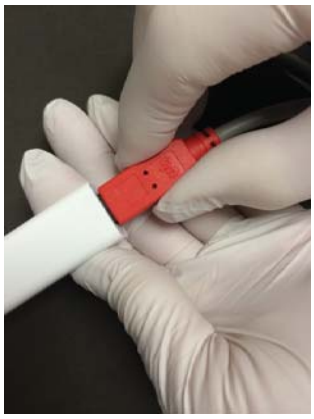
**Warning:** Before and after each use, follow these instructions to disinfect the PlanScan. Do not substitute any other cleaning solution or procedure. Under no circumstances should you use any paint thinner, solvents, or harsh chemicals. Use only a non-woven sponge or pre-moistened germicidal cloths when cleaning the PlanScan.

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.
3. Attach the protective (nonfunctional) scanner tip to the scanner base when the scanner is not in use.

# Removable Components

The PlanScan system has a set of removable components.

## Connecting the Thunderbolt™ Adapter



Properly connecting and disconnecting the scanner prevents damage to your devices.

1. Insert the Thunderbolt adapter into the adapter slot on the side of the laptop. (The adapter should remain attached, even when not in use.)
2. After opening the PlanCAD software, connect the red FireWire connector of the scanner into the white Thunderbolt™ adapter.

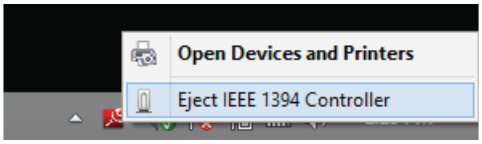
The laptop gives an audible signal to confirm that the connection is fully seated.

To remove the scanner, hold the red end with one hand and with the other hand grasp the Thunderbolt adapter. Gently pull apart to disconnect. Leave the white Thunderbolt adapter attached to the computer.

## Disconnecting the Thunderbolt™ Adapter

If you wish to remove the adapter from the laptop:

1. Disconnect the scanner and exit Romexis to the Windows desktop.
2. Navigate to the Eject Media icon in the lower left corner of the desktop. 
3. Click the icon and choose **Eject IEEE 1394 Controller.**
4. Remove the Thunderbolt adapter from the laptop.




**Note:** Failure to follow this procedure may result in an inoperable scanner. For additional questions or concerns please contact Customer Support at 800.537.6700.

## Connecting the Scanning Tip

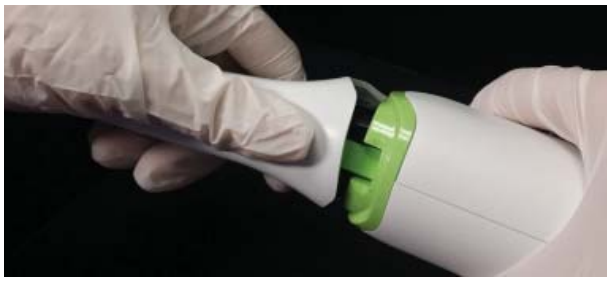
*(After disinfection if scanning intraorally. See insert with scanning tips for further details.)*

1. Grasp the body of the scanner with one hand.
2. Use the other hand to press the scanning tip onto the scanner as shown. A locking click is heard once the tip is fully seated.

## Disconnecting the Scanning Tip

1. Grasp the body of the scanner with one hand.
2. With your other hand depress the green button on the underside of the scanner. Gently pull the tip from the scanner.

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

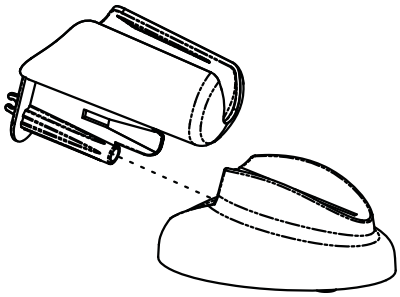


**Note:** Failure to follow this procedure may result in damage to the scanner and scanning tip.

## Scanner Cradle (for Laptop Systems)

The PlanScan laptop comes with a standalone cradle for the scanner.


The cradle can be separated and inserted into a 5/8 inch (16 mm) holder in your operatory equipment (i.e. the slow speed suction holder).

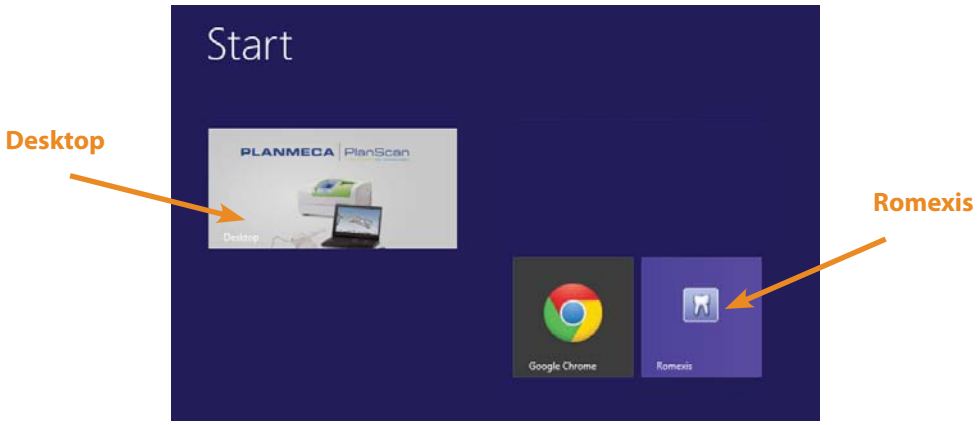


# Windows 8.1

The PlanScan system uses the Windows 8.1 operating system. This section is for those who may be unfamiliar with Windows 8.1.

### *Start Screen*

When the laptop starts up, a Start screen appears with several tiles. Click the Romexis tile to open the Romexis software. The Desktop is also a tile on the Start screen. Your tiles may differ from those shown.




If you click on another tile and don't know how to exit, press the Windows key to return to the Start screen.

### *Screenshots*

You may wish to save an image of the screen for communicating with associates or E4D Customer Support.

To take and save a screenshot:

1. On your keyboard, press the key and **Prt Sc** key.
2. The computer takes a screenshot and saves it in **Libraries - Pictures - Screenshots.**
3. The screenshots are automatically numbered. You can rename them if desired.

### *Shutting Down in Windows 8.1*

The Start button is no longer on the desktop taskbar in Windows 8.1.

1. Move the mouse to the top-right corner or the bottom-right corner of the monitor to bring up the slide-out menu.
2. Click **Settings.**
3. Click **Power.**
4. Click **Shut Down.**

**Note:** Windows 8.1 should be updated regularly.

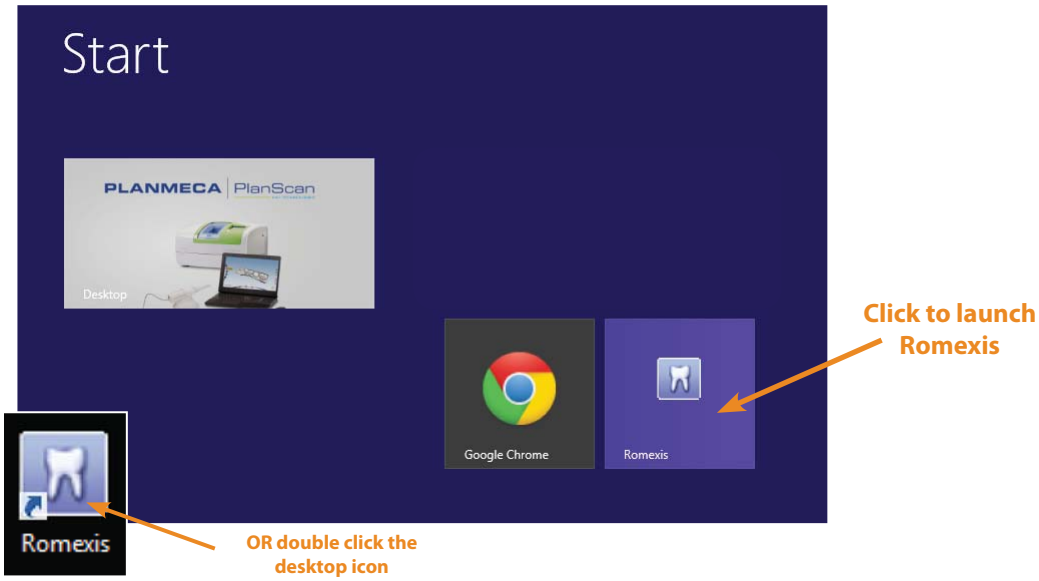
# Romexis

Romexis is an all-in-one digital solution provided by Planmeca. It can store, capture, and manipulate 2D, and 3D images as well as allowing for treatment planning and exporting data.

**Note:** For more information, see the Romexis manual.

## Starting Romexis

Click the Romexis icon on the Start Screen or double click the desktop icon. Refer to the Windows 8 section of this workbook for more information regarding this process.




## Managing Patients in Planmeca Romexis

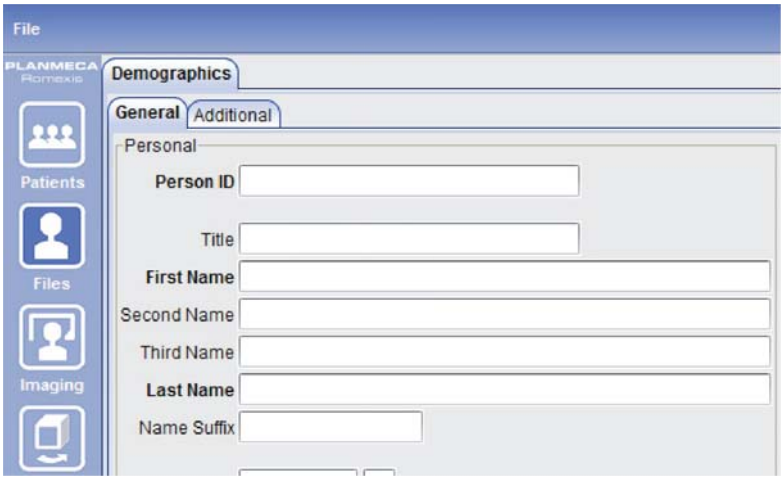
### *Creating new patients*

1. In the **File** menu click the **Add Patient** button. 


The Files module opens.

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

**Note:** The obligatory fields are Person ID, First name, and Last name.



3. To save the patient into the database click the **Save Patient** button at the bottom of the screen.

**Note:** The changes are not saved unless Save Patient button is used.

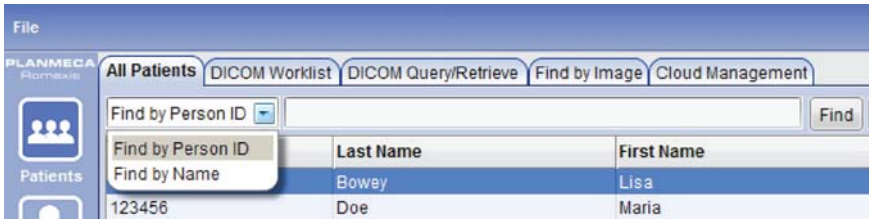
**Note:** To view the newly created patient on the list, perform new patient search.

## Searching Patients

Patients can be searched by ID or by name.

### *Search patients by ID*

1. Select the option **Find by Person ID** from the drop-down menu.
2. Enter the patient ID in the text field and click the **Find** button.




### *Search patients by name*

1. Select **Find by Name** from the drop-down (see image above).
2. Enter the patient's name in **Last name, First name** format into the search field and touch the **Enter** key or click **Find** to make matching patients appear in the patient list.

To view all patients saved in the database use the * sign as the search term.

If a partial name is entered all patients whose last name begins with that partial string are shown. To search patients by their first name replace the last name with the wild card *.

**Examples:**

- **Doe, John:** all patients whose last name is Doe and first name John
- **S:** all patients whose last name starts with the letter S
- **Smi :** all patients whose last name starts with 'Smi', e.g. Smith and Smiley
- **Van Gogh:** all patients with the last name Van Gogh
- ***, Paul:** all patients whose first name is Paul

## Sorting patients

Patients in the patient list can be sorted by ID, last name, first name, birth date, age, gender, phone number, the number of assigned providers and type (for virtual and template patients) as well as by assignments.

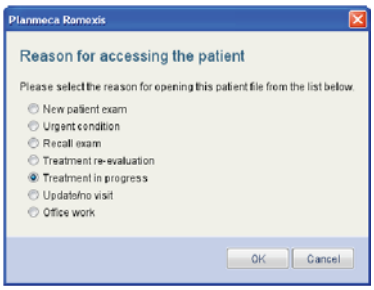
To sort patients click the respective column title.

| Person ID | Last Name | First Name | Date Of Birth | Age | Gender | Phone Number | Provider | Type | Assignments |
|---|---|---|---|---|---|---|---|---|---|

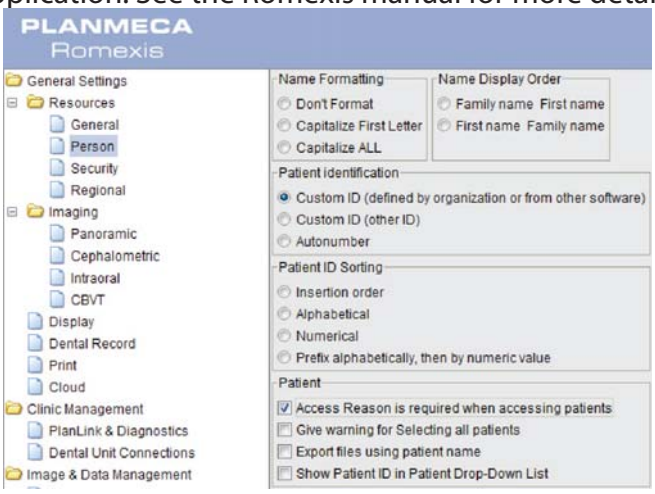
## Selecting and opening patients

1. Click the patient name in the patient list.
2. Click the **Select** button (or double-click the patient name).


3. In the opening dialogue select the reason for accessing the patient record and click **OK.**




**Note:** This request can be set as optional in the Planmeca Romexis Configuration application. See the Romexis manual for more details.




Planmeca Romexis automatically opens the Files module.


The reason for accessing a patient record is saved and displayed in the dental record under the patient case history.

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.


## Starting a New Restoration

1. Open the desired patient file.
2. Click **CAD/CAM.** 

3. To start a new scan click **New Scan and Design**. 

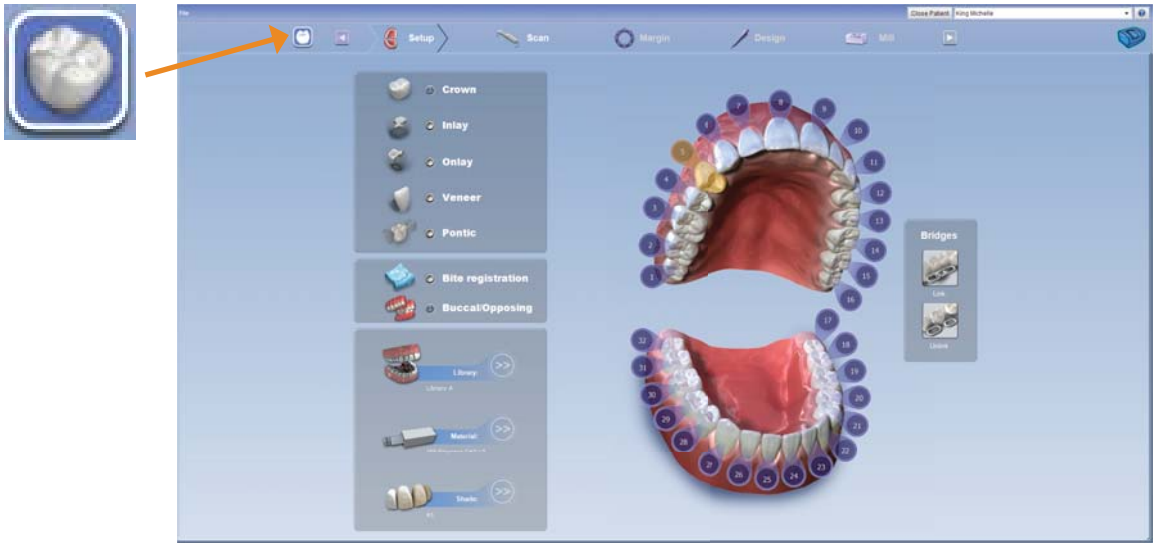
   **Note:** Click **New Scan Only** if you do not have a design license.

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

   **Note:** Click **Open for Design Only** if you do not have a scanning license.

The case opens in the Planmeca PlanScan Full System Setup tab.

From here, the majority of the screens are similar to what you are used to in previous DentaLogic versions. Click Home at the top of the screen to exit the PlanScan and PlanCAD software and return to the Romexis screens.



# Button/Icon Changes

The functionality has remained the same, but there are some new icons in the PlanScan and PlanCAD software.

| Icon | Previous Version | PlanScan/PlanCAD |
|---|---|---|
| Data Density View |  |  |
| View ICE |  |  |
| Impression Mode |  |  |
| Return Home<br>Exit CAD/CAM |  |  |

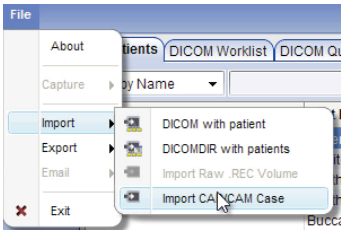
# Patient Data Management

The open architecture of Romexis gives you the freedom to Import scan data from our previous versions of software into PlanCAD. It also allows the export of data to DDX, Planmeca Romexis Cloud, and to your local machine.

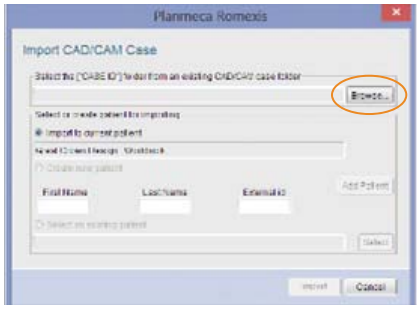
## Importing CAD/CAM cases

You can import cases from another Planmeca or E4D system into Romexis. Cases from previous versions can be opened in PlanScan, but the Scan tab is disabled. Older models cannot be trimmed or aligned.

1. In Romexis, click **File - Import - Import CAD/CAM Case.**




2. A new screen appears. Click **Browse** to find the file with the time and date stamp as the folder name, ex. **[3-25-2014 10:37:42 AM].**




- If you have exported the files from another Planmeca system, a .zip file is created with the restoration number(s) as the name. Extract the files and open the folder to find the time and date stamped folder.
- E4D patient files are stored under the customer name or whatever naming convention was used in the E4D system. c:\d4d\DesignCenter\patients\Joe Smith\restorations\

3. Select how you want to import it:
   - Import to current patient
   - Create new patient (available when there is not a patient file currently open)
   - Select an existing patient (available when there is not a patient file currently open)

# Importing 3D models

## 3D model import

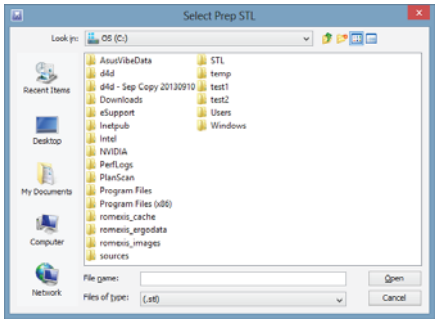
To import models click **3D model import.** 

The following window opens.


You may import models either from an external source or from Planmeca Romexis 3D module's Volumes tab.

### *To import models from an external source:*

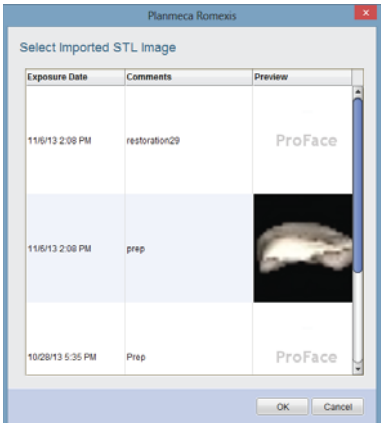
1. Click **Browse.**
2. Browse to the folder from which you want to import the models.
3. Select the files and click **Open.**




The imported files appear in the Patient's case files window.

***To import models from the Planmeca Romexis 3D module's Volumes list:***

1. Click **Select.**
2. In the following window select the file to import and click **OK.**




3. Select the model(s) to import and click **OK.**

The imported files appear in the Volumes tab.

# Exporting 3D models

## 3D model export

To export 3D models in STL format click **3D model export.** 

> **Note:** For equigingival or subgingival margins, ensure you have used the Retract margin tool to define your margin. The drawn margin is not converted to STL and the recipient will not be able to use ICE View to find the margin. See the "Retract" section below for more information.

## Cloud export 

To export scans and restorations via Planmeca Romexis Cloud click **Cloud export.** For more information on how to use the Cloud service, see the User Manual.

## Send to iRomexis 

To send the model to iOS click Send to iRomexis. For more information on how to use the Planmeca iRomexis see Planmeca Romexis User's Manual APPENDIX C: "PLANMECA iROMEXIS".

## DDX Export

To send STL models via the DDX website, click DDX Export. For more information on how to use the DDX Export, see the User Manual

## Export CAD/CAM Case

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

# 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.

**Note:** 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*

**Note:** 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. 

# PlanCAD

PlanCAD includes the scanning capabilities that and the bridge software that were introduced with the NEVO (5.0) version. For complete instructions, see the User Manual.

## Buccal/Opposing is the New Default

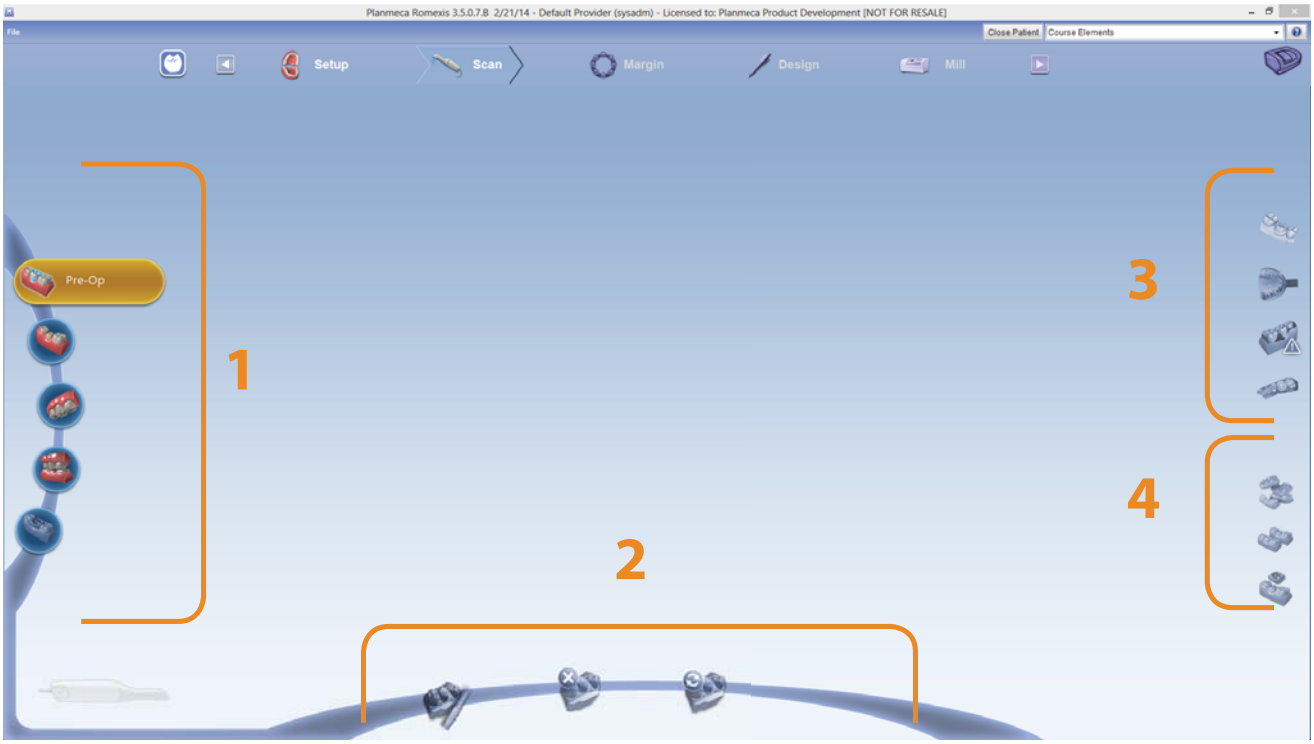

With the faster scanning, more clinical operators prefer the Buccal/Opposing option for capturing the occlusion data.

Many clinical operators scan the Opposing while the patient is being anesthetized. Scan the Buccal Bite after the tooth has been prepped.

If you are unfamiliar with scanning the Buccal Bite and Opposing, see the back of this booklet.

## Scan Tab Layout

The Scan tab has a different look and a lot of new functionality.




1. Scan Type
2. Model Editing Tools
3. Evaluation Tools
4. Alignment Tools

### Scan Type

The default selection is always **Pre-op** (formerly Clone). The other available options depend on whether Bite Registration or Buccal/Opposing was selected on the Setup tab.

Click the desired icon to select it.

## Scanning with PlanScan

The scanning pattern does not need to change.

> **Note:** For multiple anteriors and full arch cases, many operators use a "saddle" pattern to roll back and forth over the straight and long anterior teeth. This pattern can help avoid misalignments when dealing with such similar teeth.

***Goal:***

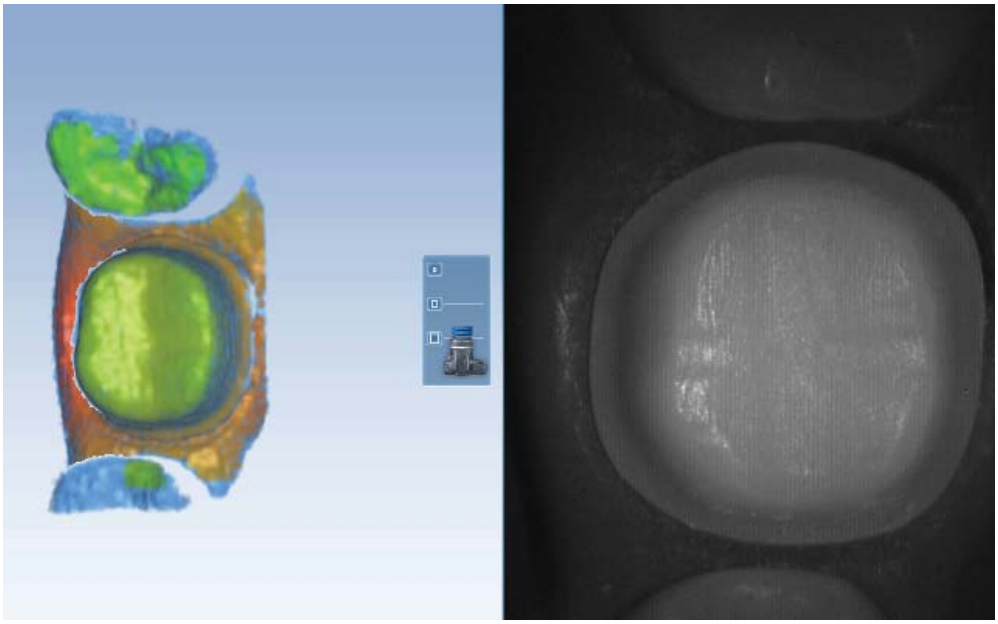
- 100% of the prep and interprox. contact areas
- 90% of the proximal neighbors
- Good axial data for design
- 2-3 mm gingival tissue on buccal and lingual

1. Rest the tip of the scanner on the teeth to achieve the optimal focal distance.
2. Click the **Power Button** on the scanner or press the **Spacebar** on the keyboard to activate the scanner.

The Live View displays on the right side of the screen.

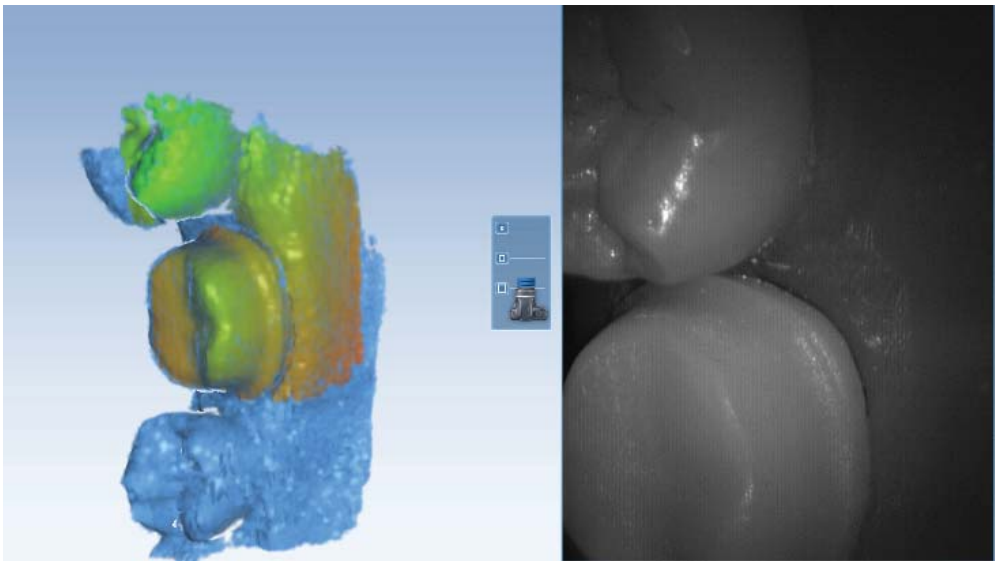
3. Start scanning with an occlusal view of the preparation or proximals. The first scan still determines the orientation of the model.

The system starts scanning as you get into place and stop moving. Once the first scan is taken and the model starts to build, move slowly in the scan pattern. You do not have to stop to take individual pictures. The scanner picks up the data as you move. You can watch as the model builds on the left to see what data has been captured and what is still needed.

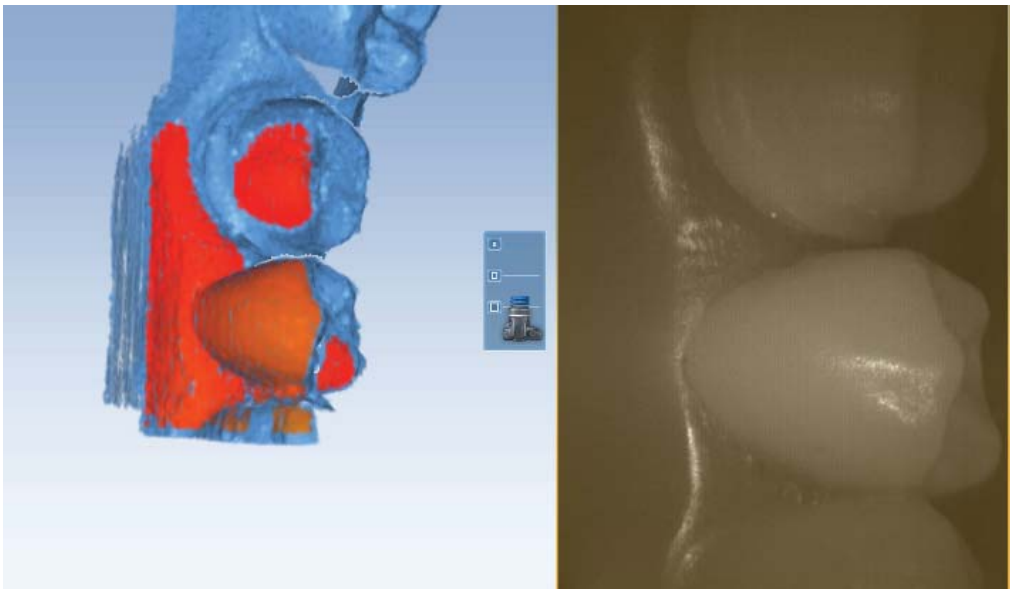


4. Watch the model building on the left as you scan. The Focal Distance Gradient (see following section for more information) shows you the most recently applied information and helps you visualize where you need to go.

In previous software versions, the operator's attention was usually on the Live View to watch the shrinking target indicator and to move the scanner in half-tooth increments for the next scan. Most operators kept the building model on the left in their periphery vision to see where the scans were added. With PlanScan, most operators watch the building model and use the Live View only when they need to alter their positioning. With the new video-like rate of capture, the scanner is almost always moving and the building model shows the operator what they have and what is still needed. Watch the focal gradient to see where you are and the blue raw data model shows what is still needed.

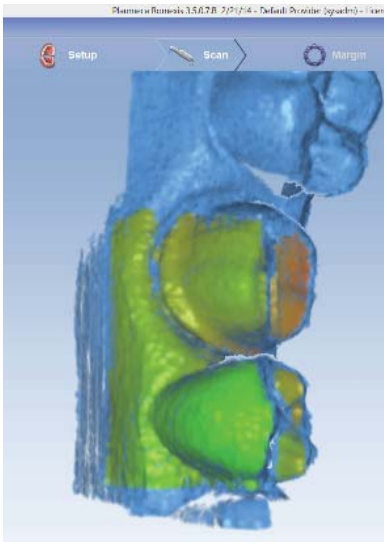


If you move too quickly, move too far away, or if the system isn't sure where you are, the Live View turns sepia. Move back to an area that's already been captured and when the system starts capturing data again you may proceed.

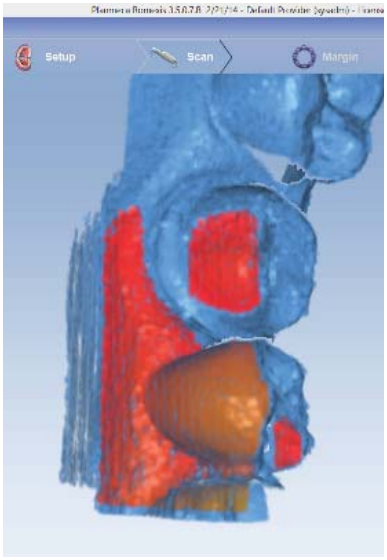


### *Focal Distance Gradient*

The color gradients on the model indicate the location of that data point within the focal distance. Red data is still good data, but it is at the far end of the scanner's focus. If you are trying to capture data that is beyond something else that is red, then you need to get closer or try a different angle with the scanner.

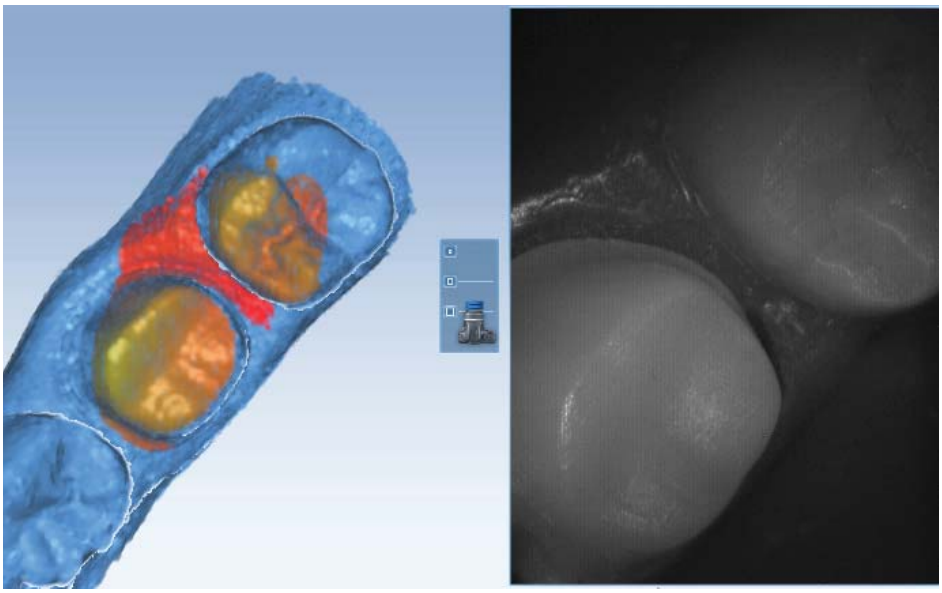



Normal focal gradient. You see green close to the scanner and red as it gets further away.



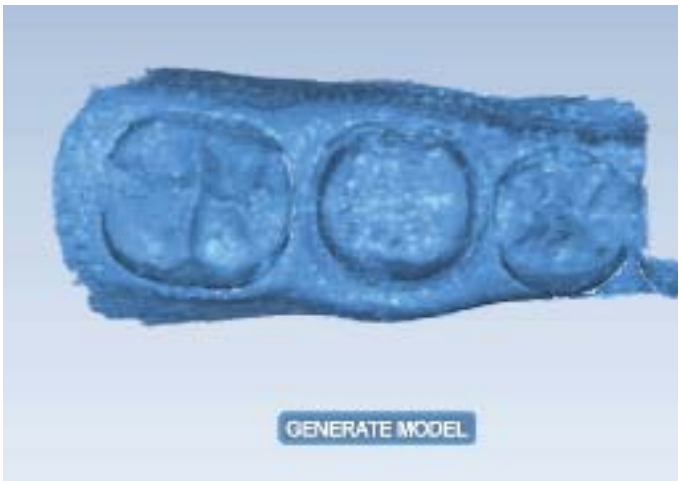

If the scanner tip is not resting on the teeth, you may see red with no green. You are still capturing data, but you may need to move closer.

To capture the interproximal areas, it may help to turn the scanner and tilt it to capture the undercut area. In the example, the focal gradient is red, but we are able to capture the interproximal data.



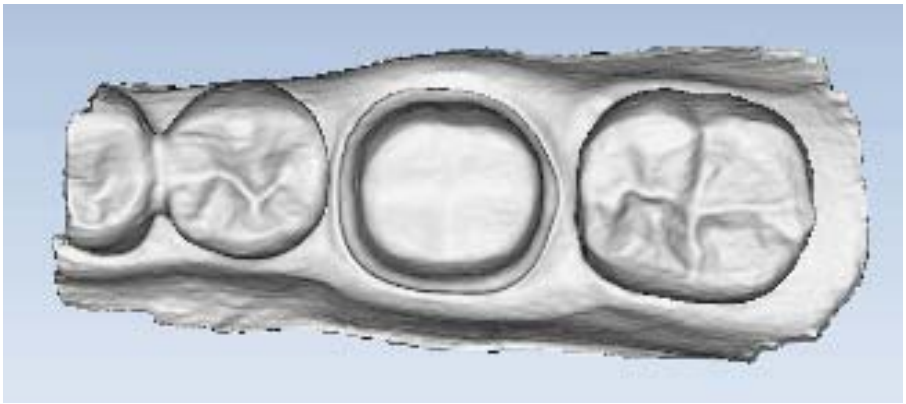
**5.** Once you have finished your basic scans, turn OFF the scanner.

The model displays in the raw data form.




**6.** Click **Generate Model** or press **M** on the keyboard.

The 3D model is created.



## Adjust Live View Window Size

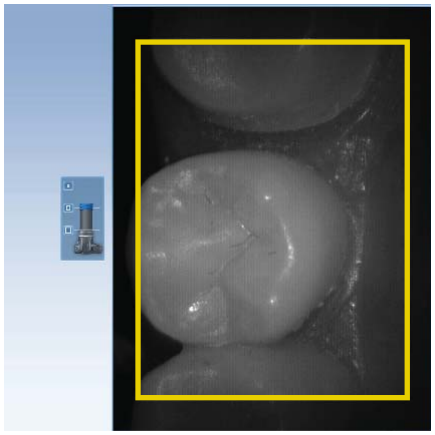
While the Live View is active, The window size can be adjusted. By default, the Live View is large enough to fill the height of the scanning window. To make it smaller, place the mouse cursor on the left edge of the Live View. Right-click and drag the window to the desired size.

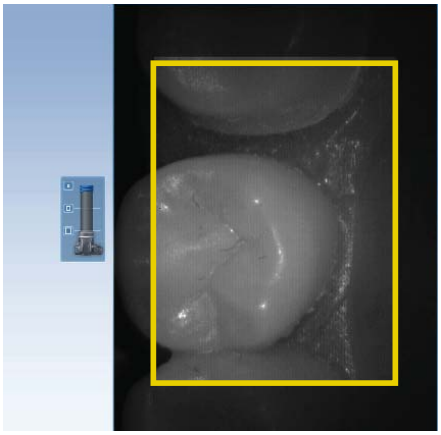
The Live View returns to the default size the next time it is activated.

## Adjust the Scanning Field of View

The Field of View or scanning area can be reduced if the movement of tongue, cheek, instruments, etc., is interfering with your scans.

Click and drag the Field of View indicator to the desired setting. In the examples, the change in the Live View has been outlined in yellow for emphasis.

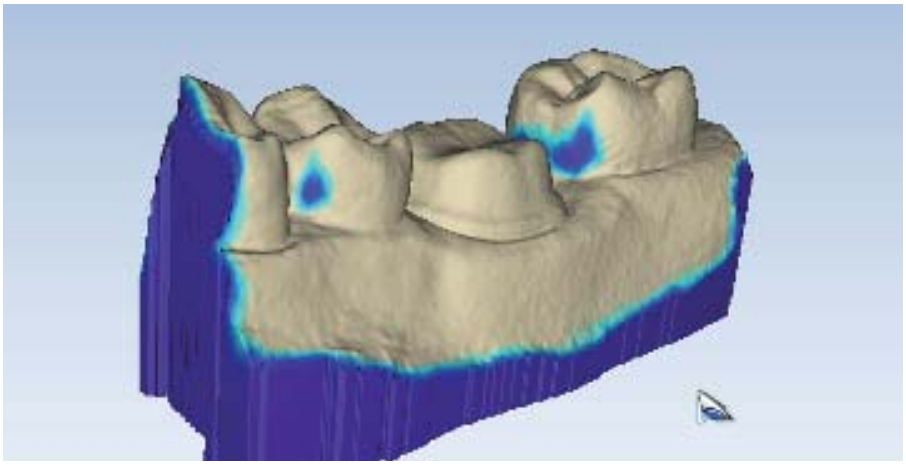




# Evaluating the model

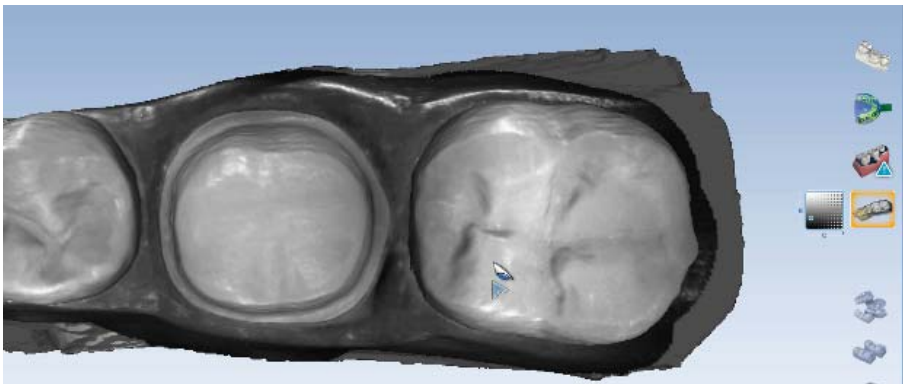
## Highlight Low Data Areas is now Data Density View

The button has been renamed, but the functionality is the same. Click **Data Density View** to evaluate the model and find any areas that need to be rescanned.

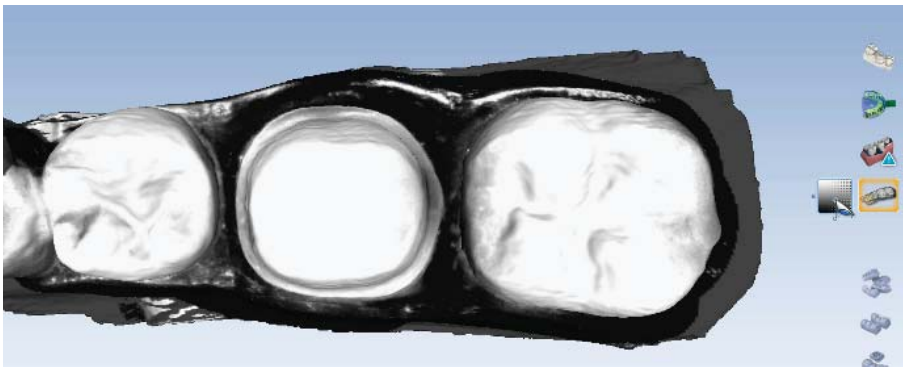


## New ICE View

The ICE View now covers the entire model. This view is mainly utilized on the Margin tab, but is also available on the Scan tab. The example below shows an intraoral scan of an implant with a metal crown at the edge of the scans. No treatment of the metals was needed before scanning.



To the left of the ICE View button is the ICE Contrast slider. Click and drag within the square (up and down, left and right) to change the brightness and contrast of the ICE View if needed to see part of the model better. This is currently only available on the Scan tab. To reset the ICE Contrast to the default, activate and deactivate the Erase button to regenerate the model.

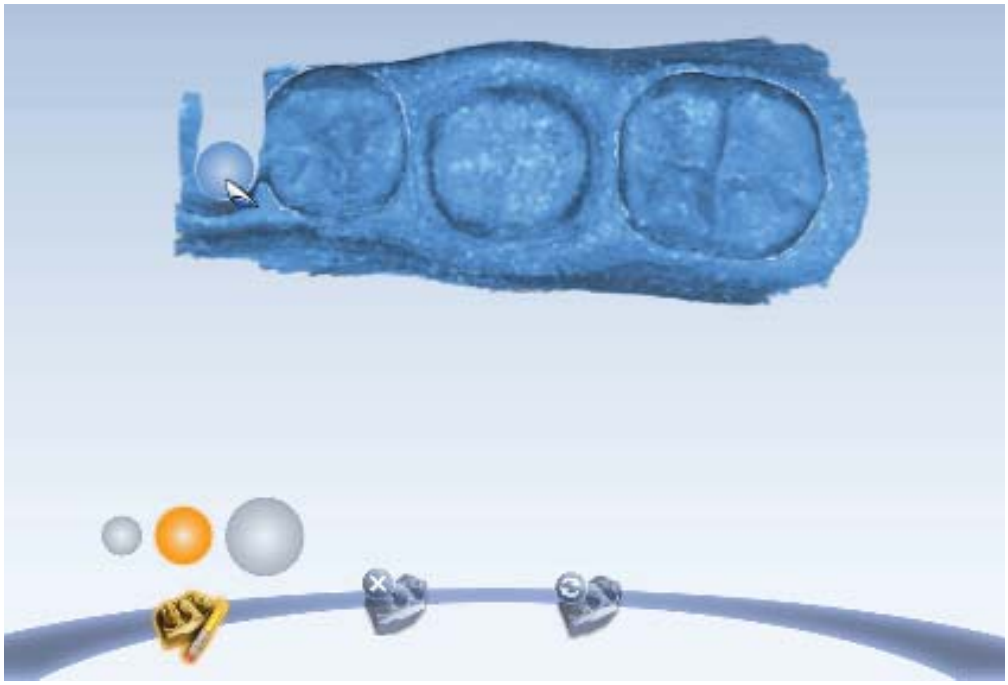


# Editing the Model

## Eraser Tool Replaces Trim Model

Trim Model has been replaced with the Eraser Brush.

With the new Eraser, click and drag to remove extra data (i.e. tongue, cheeks, etc.).



In previous versions, if you told the system to trim a part of the model, then subsequent scans of the same area would be ignored. With this new tool, you can erase an area that needs to be rescanned. If you spot a problem (i.e. the margin is partially hidden by cord or tissue), you can erase that area, correct the problem on your model or intraorally, then rescan just that area! You do not have to start over. Be sure to erase and rescan ALL areas that were changed.

The Eraser is also used in the new Time Saver tools (see following sections).

Click the **Eraser** tool to deactivate it and regenerate the model.

> **Note:** You can zoom in and out to make the model larger or smaller in relation to the Eraser tool. You can also select a different circle size above the Eraser icon.

# Time Saver Tools

These Time Saver Tools are recommended for single unit cases. For multiple unit cases and bridges, you would usually delete more of the model than you would keep. Large gaps in the model are not optimal. If 50% or more of the model would be removed, it is suggested that you rescan instead of using the Time Saver feature.

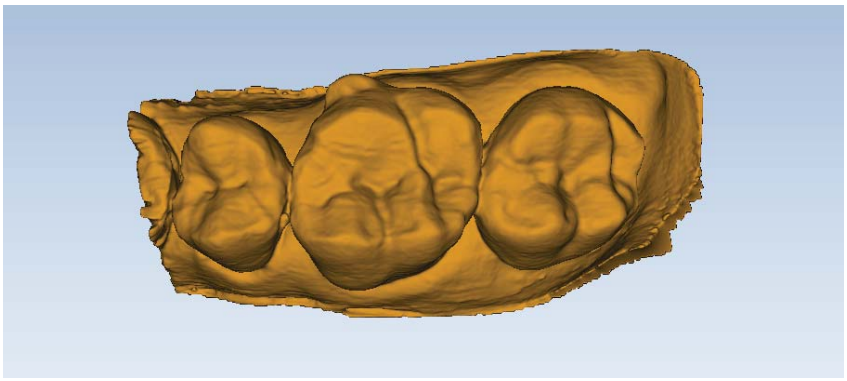
## Time Saver: Pre-op

1. Scan the Pre-op with the normal scan pattern. Remember that you can do this while the patient is being anesthetized.

   **Note:** Time Saver is not recommended for impression scans.

2. Use all of the evaluation and editing tools mentioned above.

   **Note:** ICE and Data Density are available for all scan types.



3. Prepare the tooth.
4. On the Scan tab, click **Scan Prep** 

A Time Saver message appears. This message 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.

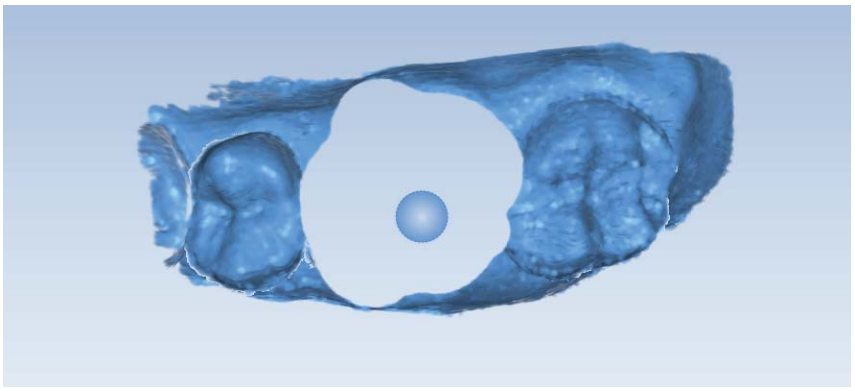
5. Click **OK** to use the Time Saver. If you do not wish to use the Time Saver option, the preparation and proximals can be scanned on their own. The following instructions assume the use of the Time Saver option.

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

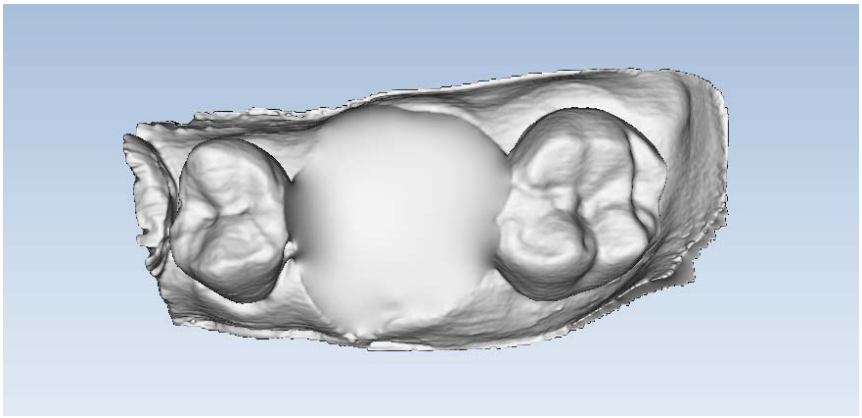
6. Click the **Eraser Tool.** 

7. Erase the tooth that has been prepared and the marginal ridges of the proximal teeth.

> **Note:** If you erase the buccal and lingual gingival data, most of your model disappears. If this happens, the other side of your model reappears as you scan the connection.



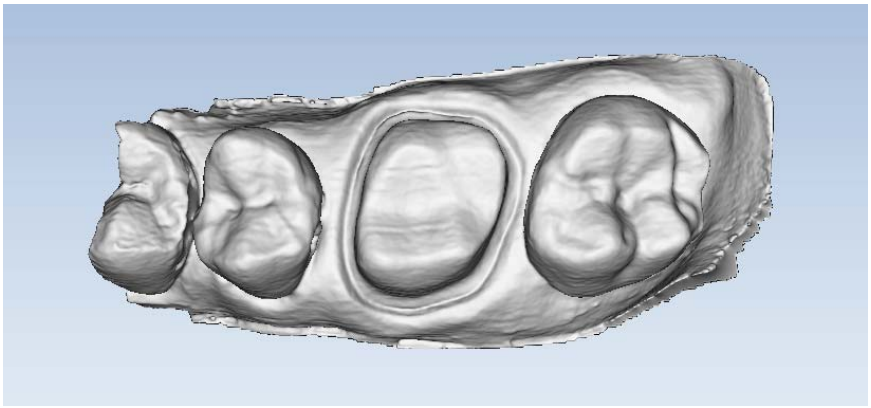
8. Click the **Eraser Tool** to deactivate it. The model is smooth where the data has been erased.



9. Activate the wand and scan begin the scans with the occlusal of one of the proximal teeth. Once you have established your position, you can begin scanning the preparation. DO NOT start your scans over the missing data.

10. Scan the entire preparation and any of the proximal tooth data that was removed.

11. Click **Generate Model** or press **M** on the keyboard.



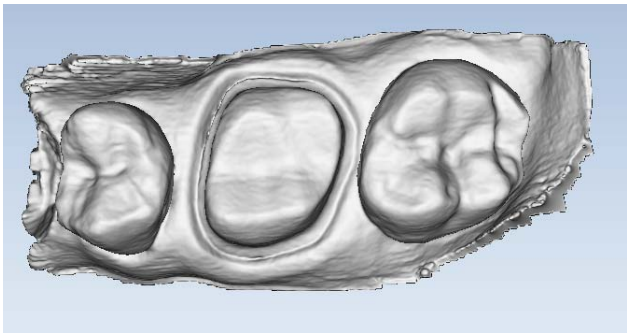
The Align Pre-op icon displays a green light if the models are aligned. A red light means that alignment must be done manually.

12. Click the **Align Pre-op** button to verify the alignment. See below for how to manually align the models if needed. Click the button again to deactivate it and return to the main scan screen.

## Time Saver: Bite Registration

1. On the Setup tab, select **Bite Registration**.


2. On the Scan tab, click **Scan Prep** and scan the preparation model first. 

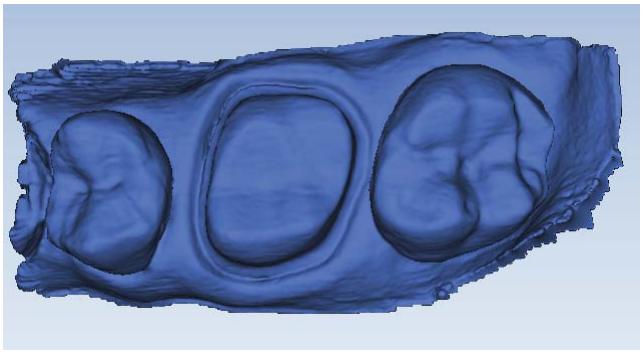


3. Click **Scan Bite**. 

A Time Saver message appears. This message 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.

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

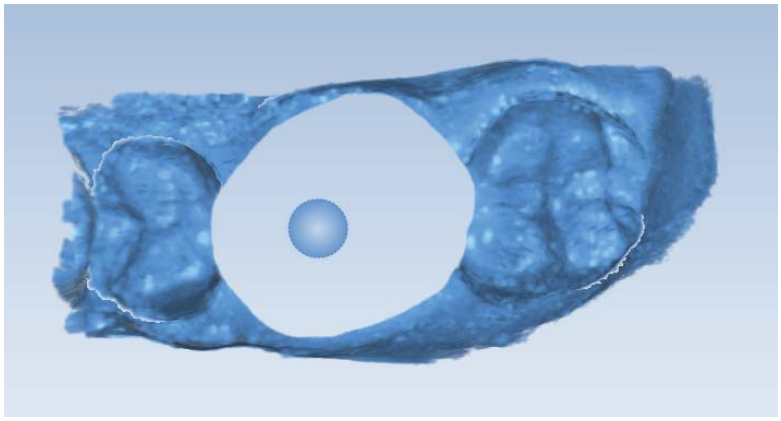
A copy of the preparation model is created in the bite registration model color.



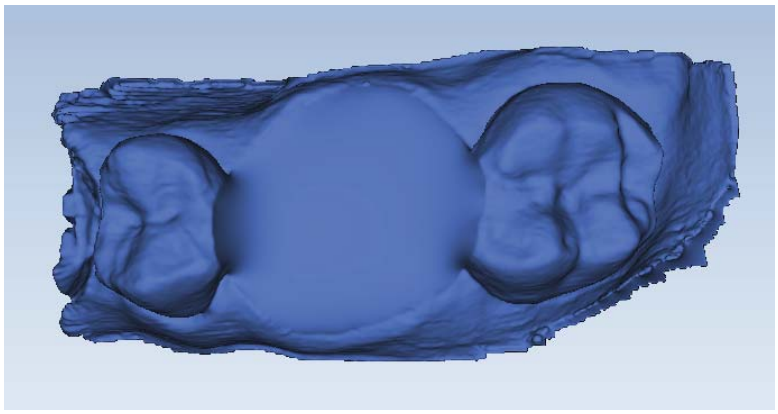
5. Click the **Eraser Tool.** 

6. Erase the preparation and the marginal ridges of the proximal teeth.

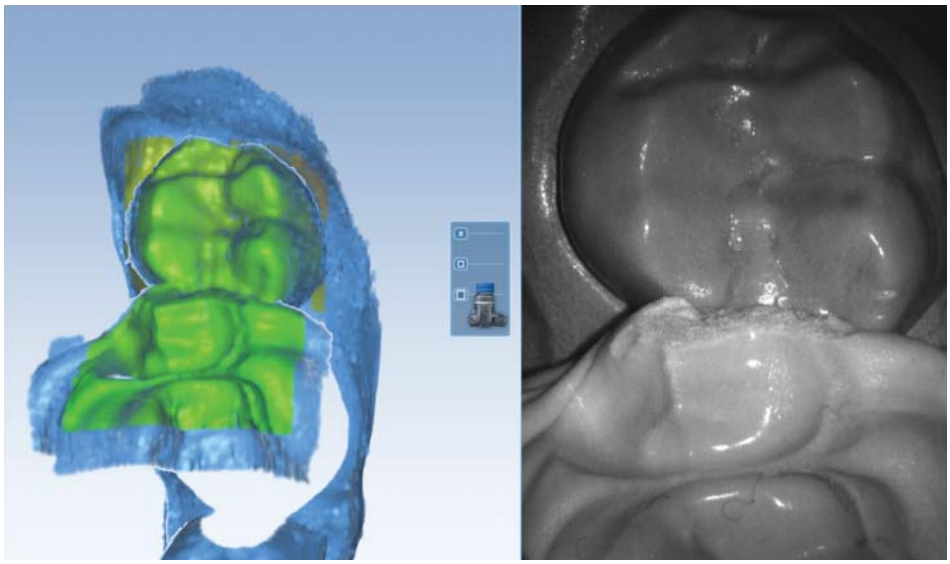
> **Note:** If you erase the buccal and lingual gingival data, most of your model disappears. If this happens, the other side of your model will reappear as you scan the connection.



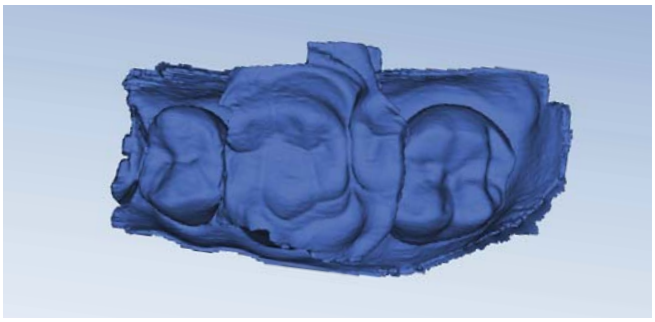
7. Click the **Eraser Tool** to deactivate it. The model is smooth where the data has been erased.



8. Activate the wand and begin the scans with the occlusal of one of the proximal 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 proximal tooth data that was removed and is not covered by the bite registration.



The Align Bite Registration icon displays a green light if the models are aligned. A red light means that alignment must be done manually.

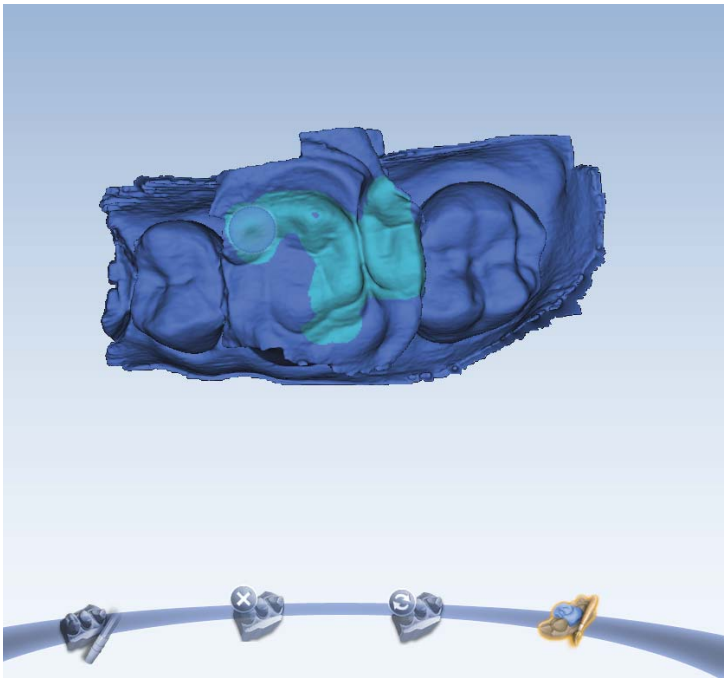
10. Click the **Align Bite Registration** button to verify the alignment. See below for how to manually align the models if needed. Click the button again to deactivate it and return to the main scan screen.

## Selecting the Bite Registration

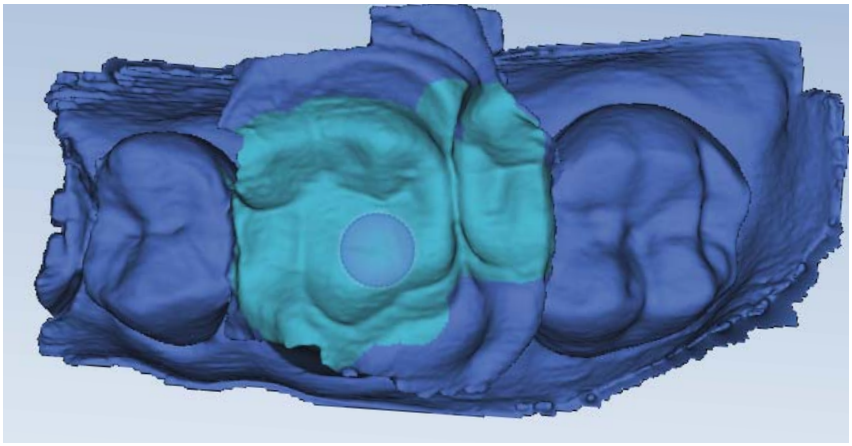
Instead of drawing the outline of the opposing dentition on the bite registration model, you now highlight the opposing dentition.

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.



Your finished highlighting should resemble the following.

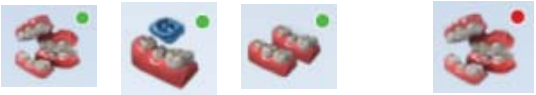


3. Click **Bite Selection** again to deactivate it.

## Model Alignment

Alignment now occurs on the Scan tab. There are no tools to rotate the models. It is important to start your scanning in the same orientation for each scan. Rescan the model if you scanned something in backwards.

The alignment icons are on the right side of the screen. There is a different icon for each alignment type: Buccal Bite, Pre-op, and Bite Registration. 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.



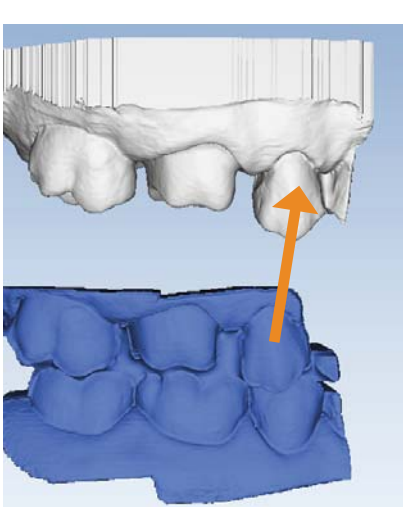


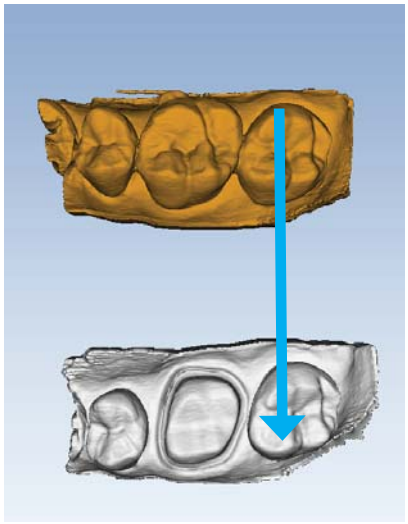
Click the icon to view the alignment. All of the alignment icons have a Refresh  button. Click Refresh to reset the alignment and manually align the models. Automatic alignment should be used in most cases.

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

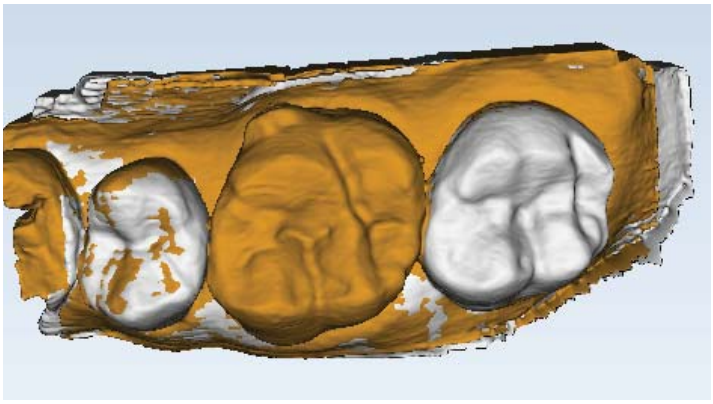
The buccal bite has an extra Show/Hide Buccal option. This enables you to hide the buccal bite model and evaluate the opposing and prep models.

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





The models snap into place.



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 (orange).

## Orientation

The pink shading for undercuts has been removed from Orientation.

## Bridges

Bridge cases are unique in that they are designed as individual teeth and milled as one unit.

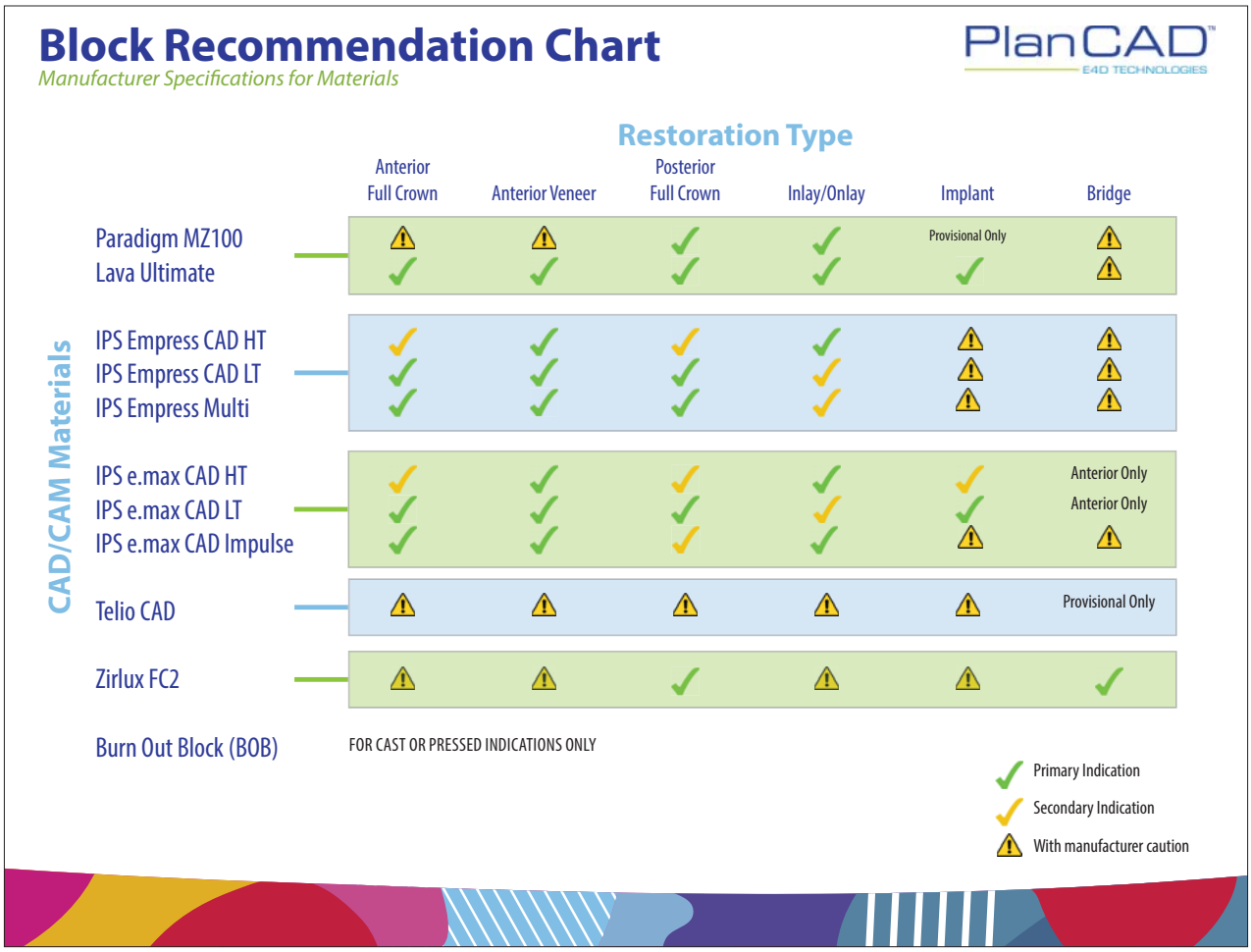
This document assumes familiarity with multiple restoration cases and other intermediate to advanced topics. Refer to your User Manual for more information.

### Bridge Preparation

Ensure the preparations for the abutment teeth are not angled in different directions. If one is pointed towards the lingual and one towards the buccal, there may be issues with path of insertion and overmilling. **Cantilever and Maryland bridges are not recommended by the material manufacturers.**

## Updated Block Recommendation Chart

- **IPS e.max** 16 mm block for longer anteriors and 32 mm anterior bridge
- **Telio CAD** blocks are intended for long-term provisional restorations (maximum wear of 12 months) (40 and 55 mm)
- **Zirlux FC2** is full contour zirconia that can be milled with the E4D Milling Center. Zirlux requires a sintering oven. Individual restoration (20 mm) and bridge block (55 mm).



## Bridge Setup Tab

A bridge is made up of two or more restorations that are connected. On the Setup tab, select each tooth on the anatomical model that is part of the bridge. For each tooth, you must select the restoration type.

1. Select each tooth that is part of the bridge - the abutment(s) and the pontic(s).
2. Click **Link.** The cursor changes to a chain symbol. 
3. Click the mesial and distal teeth of the bridge. After each end of the bridge is selected, the teeth turn purple.


4. Select a tooth in the bridge and choose the Library, Material, and Shade. This will set the material and shade for the remaining restorations in the bridge.
5. Select the remaining teeth in the bridge and designate the Restoration Type and Library. Ensure each pontic is designated as such. Library must be chosen for each restoration before you can continue to the Scan Tab.

> **Note:** If Library, Material and Shade are chosen before linking the bridge, the software will replace the Material and Shade of the remaining restorations with that of the highest tooth number after the link.

Your anatomical model will resemble the following:

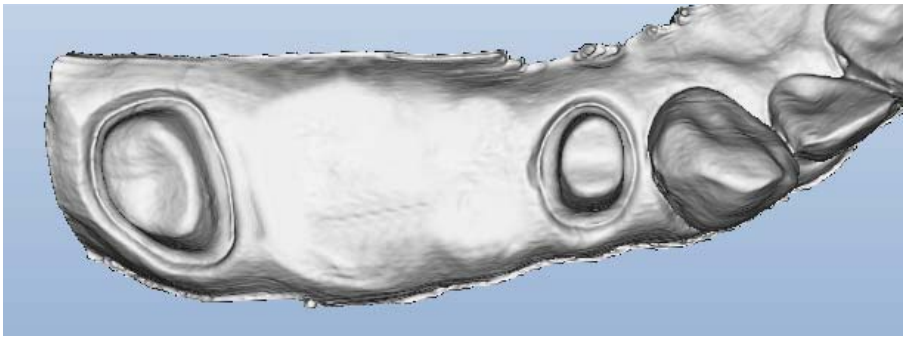

Multiple bridges can be created on the same arch. Repeat the steps above to create another bridge.

## Unlinking a Bridge

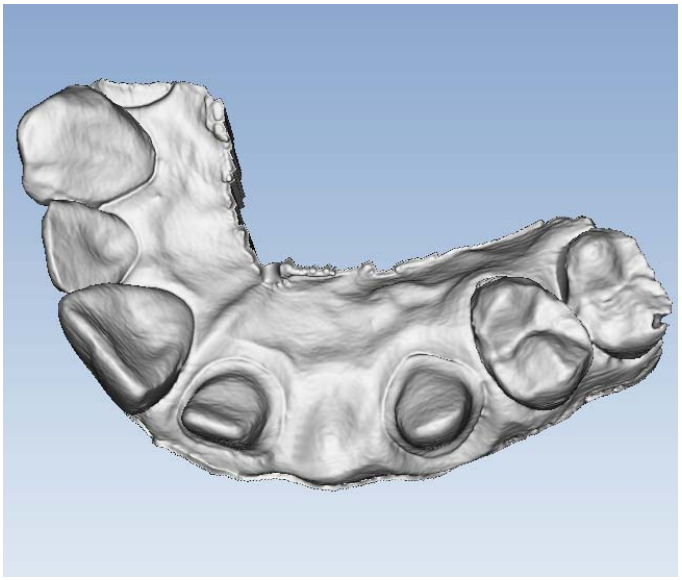
If there is an error in how the bridge was linked, click **Unlink** and click on any of the teeth in the bridge.

## Bridge Scanning

The scanning procedure for a bridge is the same as that for a multiple restoration case. Scan the prepped teeth, the edentulous area, and two or more unprepped neighbors to aid in design and alignment.



Note that scanning more teeth on anterior bridges will aid in the smile design.



## Bridge Orientation

Set the Orientation for **each** tooth tab. Good model alignment will aid Autogenesis with the design and is important for the bridge's Path of Insertion.

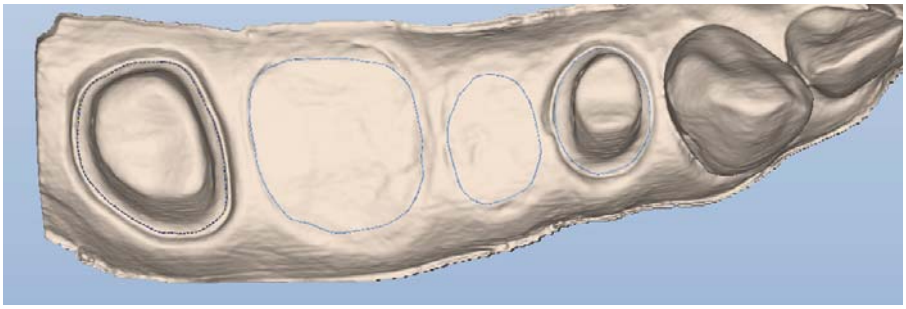
## Drawing Pontic Margins

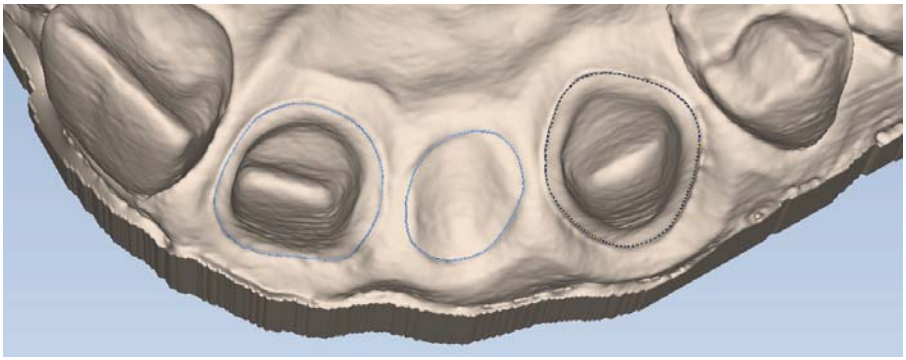
A margin is drawn for each tooth in the bridge.

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 on the gingival tissue 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.





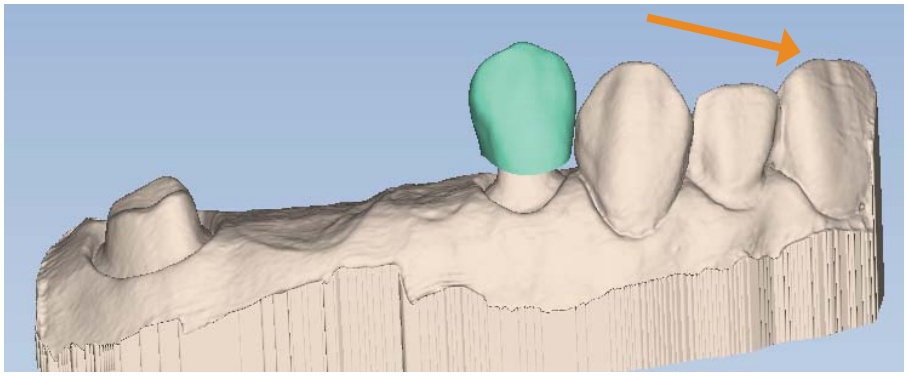
**Note:** Do not go too far down the curve of the gingival tissue or you may not be able to fit the bridge in the block.

## Designing the Bridge

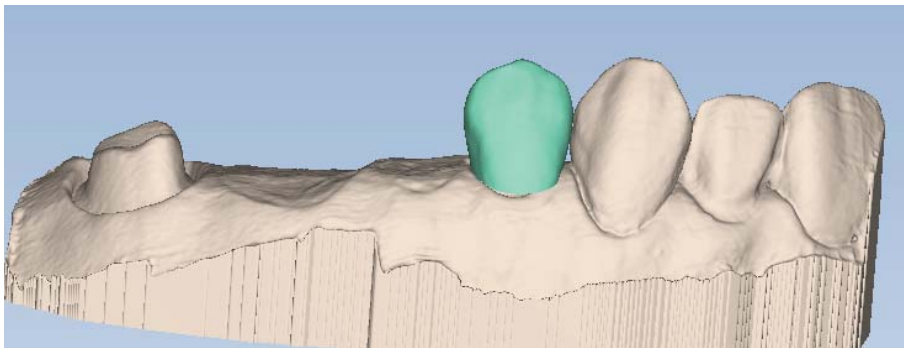
With any multiples case, it is generally best to start the Autogenesis process on a tooth with an existing neighbor. In a bridge case, that means starting with the abutments. You may need to turn off Autogenesis to control the size and position.

1. Rotate to evaluate the position of the preview library tooth.

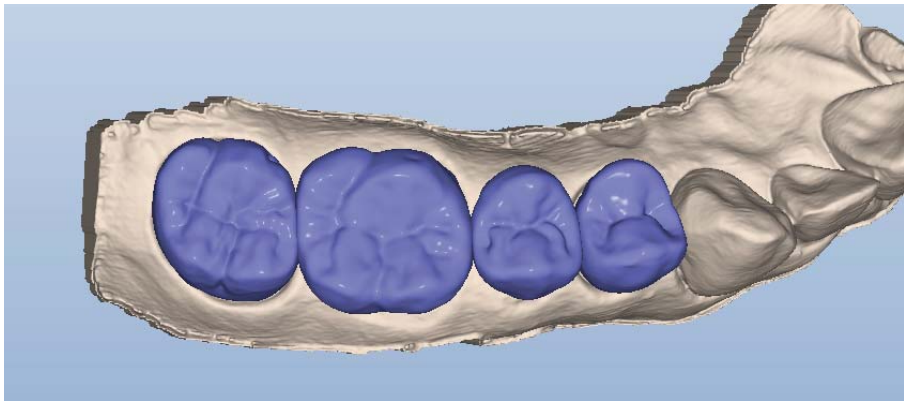
In this example, the preview tooth is high because the system is attempting to match the height of the higher mesial data. This may result in a distorted initial proposal.



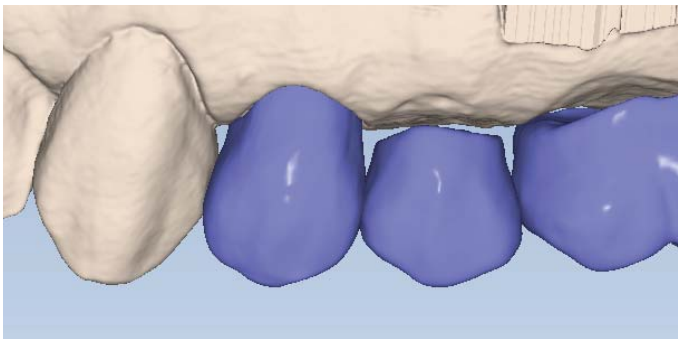
2. Resize **(Alt + arrows)** and move **(drag and drop)** as needed.



3. Click **Apply.**
4. Repeat these steps for the other abutment.
5. Repeat these steps for the pontic(s).



When you rotate the model, you will notice that the pontics have a solid base and are raised above the gumline (0.75 mm). The gingival aspect of the pontic follows the contours of the edentulous tissue and can be adjusted utilizing the design tools.



**Note:** If you are unsure whether the bridge will fit in the desired material block, skip ahead to the Mill tab and verify that it does not say "Please reorient the restoration to fit or try a different material." Verify and/or change your material selection in Settings. If the material is correct, try moving the sprue position. Once you are satisfied that the bridge fits in the block, return to the Design tab to finish designing your bridge.

6. Follow the normal design workflow with interproximal contacts being the only difference.
7. Adjust the interproximal contacts that touch unprepped teeth to the same contact strength that you normally use.

The contacts of the bridge teeth will be fused together to form the bridge, so the actual contact strength is not a concern, but the contact should be heavy enough to ensure a proper connection.

8. When you are satisfied with your designs, click the **Mill** tab.

## Spacer Tool Settings on Bridges

The default Spacer Tool settings are different on bridges to account for the larger Path of Insertion.

The normal maximum for the spacer is 0.20 mm. On bridge cases, the spacer defaults to 0.20 mm and can be increased to 0.30 mm.

A larger default margin ramp of 1 mm is used to aid in stability.

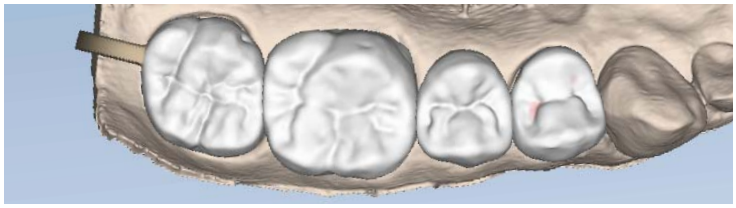
## Rotating Slice Plane

The Slice Plane can now be rotated. Place the center of the Slice Plane approximately where you want it and then hold down the **Ctrl** key while moving the mouse to rotate.

## Evaluating the Bridge

It is important to evaluate the connections on the bridge and look for possible hangups.

The sprue will be on the mesial or distal side of the bridge.

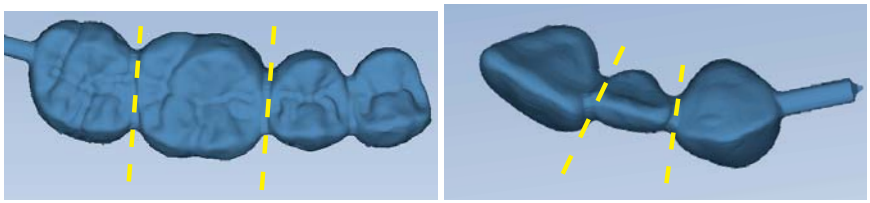


1. Click **View Model** to hide the model.
2. Click **Sim.**

When the Simulation is run, the connections between the teeth are displayed.

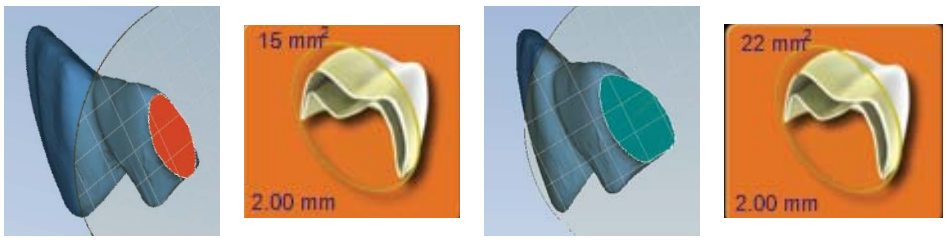
3. Click **Slice Plane** twice.

When Slice Plane is activated on a bridge mill simulation, the system measures the slice width. If the slice is thinner than the material guidelines, the slice displays as red. It is important to slice the simulation through the thinnest part of the connectors (yellow lines in the examples).



Posterior cases tend to have wider contacts with smaller embrasures and are unlikely to be thin. Anterior cases have smaller contacts and larger embrasures. Any thin area should be evaluated.

4. Move the Slice Plane to a connector. If the Slice Plane needs to be rotated to slice through the thinnest part, hold down the **Ctrl** key while moving the mouse to rotate.
5. Rotate the model to view the slice.
6. If the slice is red, adjust your embrasures and/or contacts and try the simulation again. Note that when the model is hidden, the Slice Plane icon displays the $mm^2$ area.




Minimum required thickness:

- Zirlux FC2 - 9 $mm^2$
- Telio CAD - 12 $mm^2$
- IPS e.max - 16 $mm^2$

7. Click **View Model** to activate it.
8. Click the **Gingival** View Control arrow to view the model from underneath.
9. Look for internal hangups (blue seen through the stone model on the axial walls or occlusal surface). Blue around the margin is expected due to the margin ramp. If there are any hangups, adjustments need to be made to the Spacer on the Design tab. Call Customer Support for help on your first few cases if there are hangups on Bridges.

# Milling Center Changes

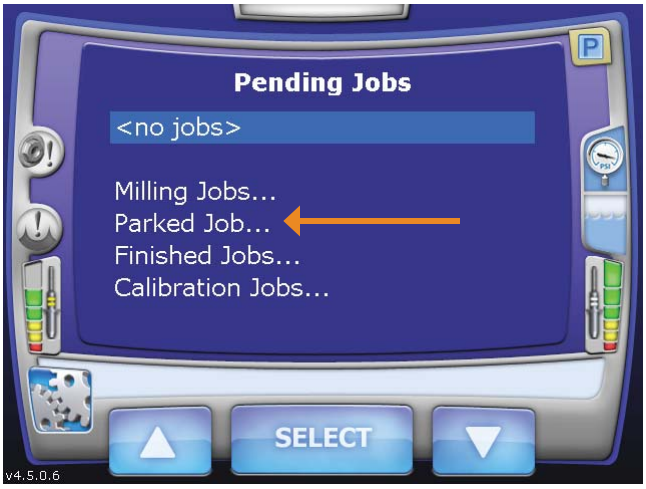
## New Icon for a Parked Job

The Parked Job feature was introduced in Version 4.5. In this update, a new icon has been added to indicate that a job has been saved.

When a job is interrupted by an error message or a manual cancellation of the job, it is saved in Parked Job. Only the most recent job is available in Parked Job.

When a job has been saved, an icon will appear in the corner to notify you.


1. To restart the interrupted job, touch **Parked Job...**



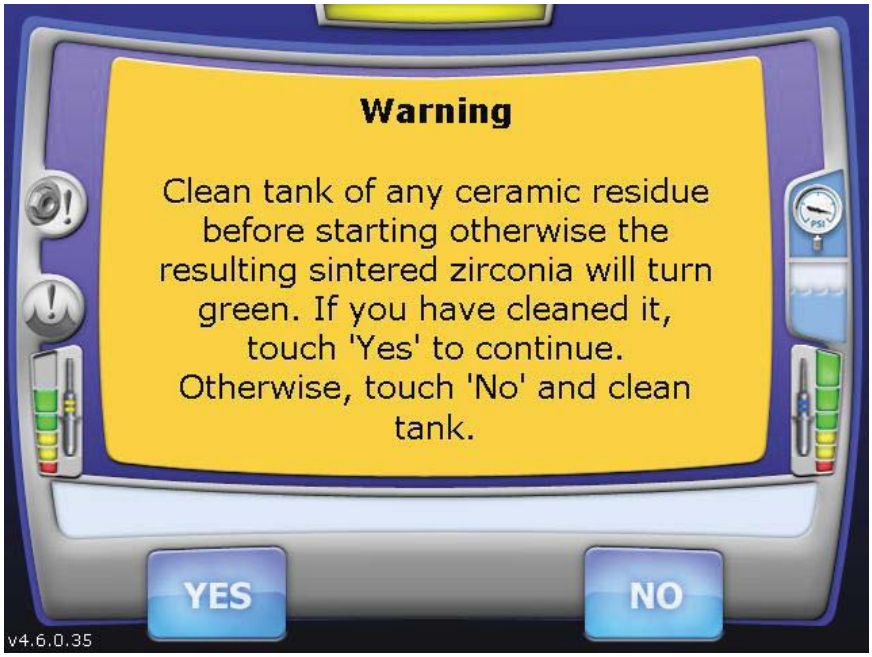

**Note:** Jobs interrupted by a power failure are not parked. Do NOT insert a new block for a Parked Job. A new block will result in broken tools. To restart the job with a new block, use Pending Jobs.

2. Touch **Select.**
3. Reinsert the partially milled block if it had been removed.
4. Follow the on-screen instructions.

The milling restarts from where it was cancelled.

## Zirlux FC2 Mill Maintenance

It is necessary to clean the mill and change the water **before** milling Zirlux FC2. If the zirconia is contaminated with other materials, it will turn green when sintered. Cleaning after milling is recommended because the zirconia acts as a thickening agent with the water.




## Zirlux FC2 Scale Factor

See the manufacturer's Instructions for Use provided with the Zirlux FC2 blocks for processing instructions.

Zirconia shrinks in the sintering oven. There are numbers on the side of the box that the blocks come in. You must keep this box with the blocks. Do not mix blocks from different boxes. Each box can have a different amount of shrinking. The Milling Center asks for the Scale Factor before a Zirlux FC2 is milled. The system will increase the size of the restoration according to this number. This means you cannot test the fit of the restoration before sintering.

# Appendix

This section is for people that have not previously been using Buccal/Opposing scanning. The instructions for scanning have not changed in PlanScan.

## Scanning Buccal/Opposing

The opposing teeth are scanned to acquire bite information for the proposal. The buccal bite is scanned to align the preparation model with the opposing model.

### *Scan Opposing*

**Note:** Many clinical operators scan the Opposing while the patient is being anesthetized.

1. On the Setup tab, **Buccal/Opposing** is the default.

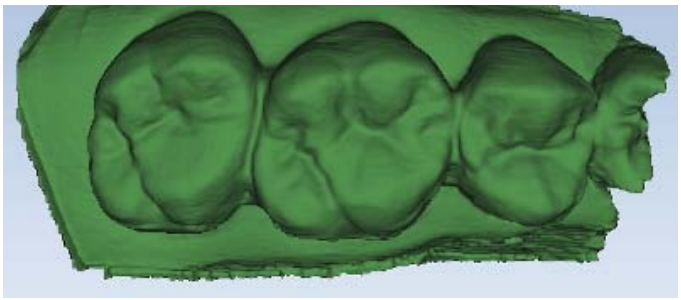

2. On the Scan tab, select **Scan Opposing.** 

3. Starting with an occlusal view, scan the occlusal surfaces of the opposing dentition. Include the same number of teeth as the preparation model. Ensure there is good cusp tip data on both the lingual and buccal sides.

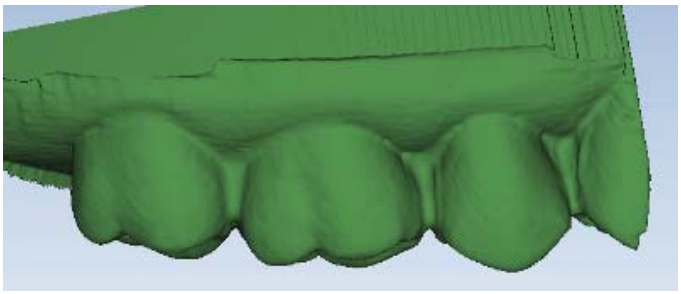
Roll to the buccal and scan the buccal side of the opposing dentition. Include gingival data, do not stop halfway down the tooth.

Your model should resemble the following:

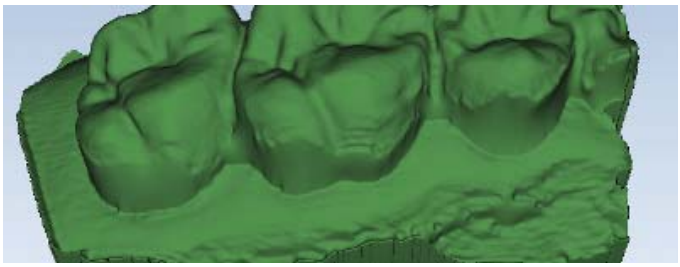
- Good occlusal data



- Good buccal data



- Good lingual cusps. Lingual axial data is not needed.



4. Erase extra data from the opposing model. 

### *Scan Buccal Bite*

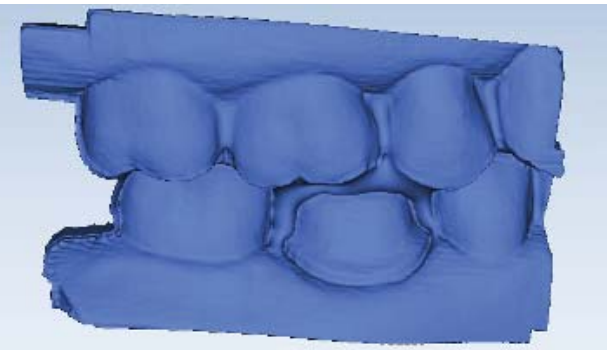
1. Click **Scan Buccal Bite.** 
2. Press the articulated model down firmly or have the patient bite down firmly and tell them not to move while you are scanning. If they shift during the scanning, the alignment may be incorrect.

**Note:** Position the PlanScan tip against the inside of the cheek while the patient is open. When the PlanScan is in place, ask the patient to close and bite down firmly. Tell them not to move during scanning. Keeping the PlanScan tip against the cheek and not rubbing against the gingiva during scanning is typically more comfortable for the patient.

3. Scan at a 90° angle to the teeth. Scan the sides of the teeth that were captured in the preparation and opposing models. Ensure some gingival data is captured.

4. Click **Generate Model** or press **M** on the keyboard. The system generates the model and attempts to align to the other scanned models. The software should automatically align the models. If Align Buccal is red, see previous for instructions on manually "Model Alignment."

Your model should resemble the following. Ensure there is good data on the buccal sides of the teeth. Intraoral scans will most likely have the tongue in the background. Model scans will have space filler in the gaps.



5. Erase any excess data from the model.

## New Documentation Available

PlanScan documentation and videos available at the Learning Tools on **www.e4d.com** home page (lower right corner).

PlanMill™ 40
E4D TECHNOLOGIES

# Mill Maintenance Checklist

NOTE: Keep this document for your records

MONTH 1

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|---|---|---|---|---|---|
| **Water** | | | | | |
| **Strainer** | | | | | |
| **Collets** | | | | | |

MONTH 2

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|---|---|---|---|---|---|
| **Water** | | | | | |
| **Strainer** | | | | | |
| **Collets** | | | | | |

MONTH 3

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|---|---|---|---|---|---|
| **Water** | | | | | |
| **Strainer** | | | | | |
| **Collets** | | | | | |

MONTH 4

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
|---|---|---|---|---|---|
| **Water** | | | | | |
| **Strainer** | | | | | |
| **Collets** | | | | | |
| **HSD Quarterly** | | | | | |

**Daily Procedures:**
Check tool wear
Turn OFF the mill
Wipe the milling chamber dry
Clean debris from chamber

**Weekly or 3hrs Milling:**
Clean water tank w/warm water
Dry internal mill areas
Clean floats & strainer
Replace fluids (water, coolant)

**Every 2 Weeks or 10hrs Milling:**
Clean spindle caps (left & right)
Clean collet & collet shafts*

*verify all internal aspects have been thoroughly cleaned

## QUESTIONS?

***Contact Support @ 800.537.6070***

NOTE: Material types and heavy use will increase the maintenance frequency!

# Quadrant & Full Arch Scanning Techniques

*Tips & Patterns*

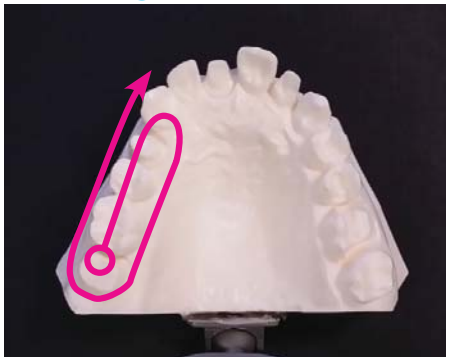
PlanScan™ E4D TECHNOLOGIES

## Quadrant Scanning

- Use of an intraoral retraction device is advised for scanning. It is critical in the anterior segment.
- The starting point should be directly over the occlusal surface. This sets the orientation of the model.
- After passing the midline on anterior segments, you may want to change the wand's orientation or "flip" to continue scanning.

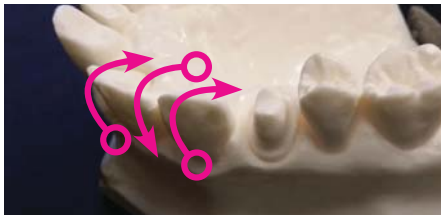
***Use these step for all quadrant scanning: pre-op, prep, and opposing.***

### Posterior Segments



Begin scanning the posterior segment using the scan pattern shown above. Use full rotations and limit excess data; such as the cheek or tongue.

### Anterior Segments

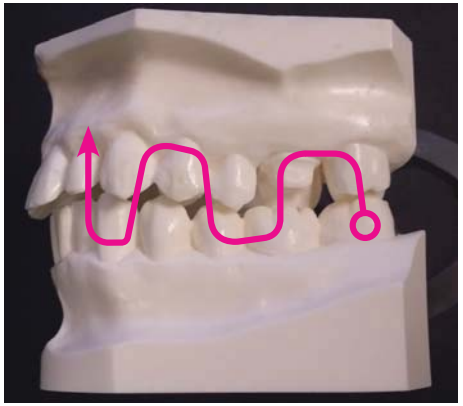


The saddle technique is used in the anterior region. Roll from the facial to the lingual in small, gradual movements. After passing the midline, you can flip the scanner position to continue. Several passes from facial to lingual, lingual to facial will be needed to complete the scan. Remember to start directly over the incisal edge.

*NOTE: When flipping, be sure to overlap the data starting from the lingual aspect.*

## Buccal Bite

- Start on the same side as the initial segment
- A full arch bite is not necessary



Begin scanning on the most distal tooth in the arch. Move in a serpentine scan pattern as shown toward the anterior region. Be sure to start scanning in the same area as the initial scan.

# Quadrant & Full Arch Scanning Technique

*Tips & Patterns*

PlanScan™ E4D TECHNOLOGIES

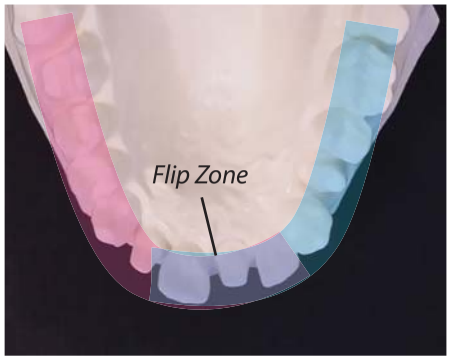
## Full Arch Scanning

- Begin scanning over the occlusal surface of the most distal tooth. The first scan sets the orientation of the entire model.
- Rotate to the lingual and then to the facial for each tooth. This will give you the best accuracy while scanning.
- For Full Arch scanning, flipping the scanner after passing the midline will be crucial. The data must overlap in the "flip zone".

***Repeat these steps for the opposing arch. Remember to capture the bite.***

***See the other page of this document for the buccal bite scanning technique.***

*Using the saddle technique throughout the arch will ensure an accurate model.*




*After passing the midline, flip the scanner. Be sure to overlap the data.*

*Start directly over the occlusal surface, rotate to the lingual*

*From the lingual rotate to the buccal*

*Rotate to the lingual of the neighbor and continue scanning from lingual to buccal for each tooth*

# Scanning Technique
## Goals & Patterns

PlanScan™
E4D TECHNOLOGIES

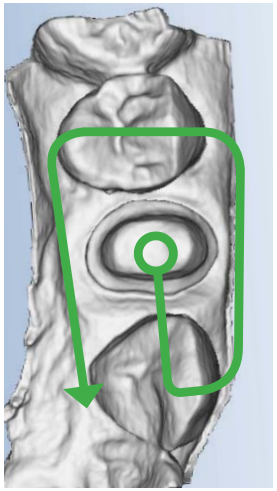
### Preparation

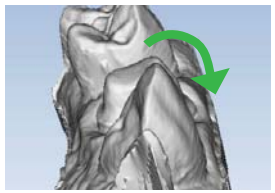
100% of the prep and interproximal contact areas

90% of the adjacent teeth

Good axial data for design

2-3 mm gingival tissue on buccal and lingual





### Interproximal

To achieve 100% of the interproximal contact area, a slight rotation of the scanner will be needed

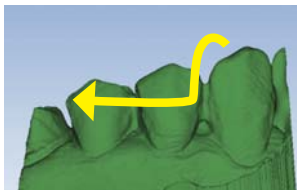
Rest the scanner on the proximal dentition and perpendicular to the arch

### Opposing

100% of the cusps

2-3 mm gingival tissue on the buccal side

Lingual and gingival data not necessary

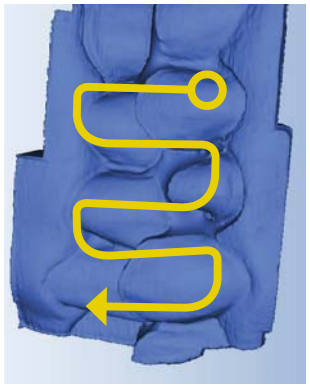


### Buccal Bite

Capture the buccal surface of the dentition in the prep and opposing

2-3 mm gingival tissue

**No rotations necessary**



Note: Information on scanning Bite Registration material can be found in the User Manual

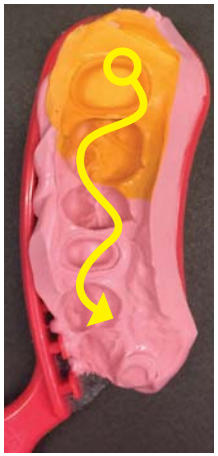
### Impressions

100% of the prep and interproximal contact areas

90% of the adjacent teeth

Good axial data for design

2-3 mm gingival tissue on buccal and lingual



# CAD/CAM Workflow

QUESTIONS ABOUT DESIGN? Contact Support @ 800.537.6070

PlanCAD™ E4D TECHNOLOGIES

## SCAN

*Buccal Bite Scanning*

### *Scan Prep*

100% of Prep and contacts

Click **Data Density View** to evaluate for low data

Use the **Eraser** tool to remove excess scan data

### *Scan Opposing*

100% Occlusal and 2mm of buccal gingival data

### *Scan Buccal*

Capture all teeth associated in Prep & Opposing scans

Verify buccal alignment, and re-align if needed

**!** Verifying the appropriate amount of scan data will ensure a better fitting restoration.

## MARGIN

### *Orientation*

*Automatically active;* use the View Circle to position model

**Occlusal** - Buccal/Lingual tip
**Distal** - Align buccal cusps
**Buccal** - Marginal ridges

### *Trace Margin*

From the occlusal view, mark the margin on the shoulder

Click **Show Features** as an aid to highlight high contour areas

Use **Move Margin** to adjust placement

Use **Add Segments** to redraw a portion

### *Orientation Guide*

After deactivating all tools, use the green Preview Tooth to verify orientation.

### *Margin Marking Guide*

ICE mode can be used in margin detection; remember stone mode is priority

## DESIGN

### *Tooth Libraries*

**Autogenesis**™ ON - Click APPLY
**Autogenesis** OFF - Resize, Reposition, Re-Apply

### *Incremental Tools*

Large adjustments to tooth position - Fitting the proposal in its space

### *Freeform Change Tools*

Small adjustments to contour - Fine tuning the design

### *Material Thickness*

Occlusal table - 1.5 to 2 mm (Dark Green/Blue)
Axial walls - 1.0 to 1.5 mm (Green)
Margins - Yellow

### *Rubber Tooth*

1st - Axial Walls
2nd - Marginal Ridges (Occlusal Table if needed)
3rd - Embrasures

### *Adjusting the Bite*

Activate **View Bite Registration** (click twice) then activate **View Contacts** to evaluate. Use **Contact Refinement** (small circles) to adjust to White, Brown, Black.

### *Adjusting Interproximal Contacts*

Turn OFF **View Bite Registration** and activate **Hide Model**. Rotate to the mesial and distal to evaluate interproximal contacts. Return to ***Freeform Change Tools, use Smooth Surface to adjust*** to Light Green/ Aqua surrounded by Dark Blue.

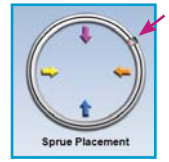
### *Recheck Material Thickness & Check Margins*

Verify that design changes have not affected the appropriate material thickness for milling.

Margins should be Yellow. If Red/Orange, verify margin placement with **Move Margin**. Use **Dropper** as needed to add material.

## MILL

**!** Bright Yellow on the occlusal or axial surfaces indicates low material thickness and should be adjusted in the Design tab.




### *Sprue Position*

Away from margins, contacts, and occlusion. Initial position is the fastest milling time. Verify the end of the sprue is round.


### *Mill Sim*

Check the internal fit of your restoration before milling.

### *Block Size Selection*

Available block sizes depend on sprue position and the material selected.



**Congratulations!**