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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 PlanScan digital impression scanner, Planmeca Romexis CAD/CAM design software module, and Planmeca PlanMill 40 mill.

The Planmeca PlanScan 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.

**Note:** Caution: US Federal law restricts the Planmeca PlanScan 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).

**Note:** 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 Planmeca PlanScan System is an optical impression system for CAD/CAM of dental restorations. It is a device used for recording topographical characteristics of teeth, dental impressions, or stone models by digital methods for use in computer aided design and manufacturing of dental restorative prosthetic devices.

**Contraindications**

The Planmeca impression system is not indicated for orthopedics or any indication beyond dentistry.
Turn ON Laptop

Press the power button to start the laptop.

The Windows 8 Start screen appears. On your keyboard, press the key to make the standard desktop appear if desired.

Opening Romexis

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

Scanner

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 Scan tab, 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.
Scanner Indication Lights

There are colored LED lights in the button on the scanner.

- Green - Ready for Use. Scanner is connected, but not actively scanning.
- Blue - Laser ON. Scanner is actively scanning.

If scanner light is not illuminated, the scanner is not ready or it is not connected.

Cradle

The system 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).

Moving/Viewing the 3D Model

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

Using the Mouse

Rotating the Model

1. Click and hold down the right mouse button.
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.
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.
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**

Save an image of the screen for communicating with associates or Customer Support. To take and save a screenshot:

- **ASUS:** Press `+ Prt Sc` keys simultaneously.
- **HP:** 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.

**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.

**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.
**Sprue Angle Method**  
(For mill systems)

**Margin Ramp**  
(For design systems)

**Spacer Thickness**  
(For design systems)

**Dropper Tool**  
(For design systems)

**Spaceball Settings**  
(Optional accessory)

**Network Settings**

This screen should be used only under the supervision of a customer service representative. These settings are pre-configured and should not be changed.

**Workbook Exercises**  
(For Classic systems)

**Mill Notification Settings**  
(For Classic systems)

**Milling Settings**  
(For mill systems)

**Auto or Occlusal POI**  
(For mill systems)
Administration

This chapter describes the administrative functions associated with the Planmeca PlanScan System.

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.

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 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.

*To prevent damage to the scanner, pull the pieces apart gently and without twisting or bending.*

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 can in damage to scanner and scanning tip.
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 14 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.

Tip Identification

Autoclave Tips have the autoclave symbol. See “Instructions for Autoclaveable Tips” on page 13.

High Level Disinfection Tips have no symbol. See “Instructions for High Level Disinfection Tips” on page 14.

Note: Autoclavable tips compatible with PlanScan version 5.5 or later.
Instructions for Autoclaveable Tips

DO NOT use a chemical sterilant on tips with the autoclave symbol.
DO NOT Autoclave tips without the autoclave symbol.
DO NOT place in Ultrasonic Cleaner.
Excessive cycle times may prematurely reduce the life and function of the tip.

Note: These instructions were validated using a Class B autoclave and the sterilization pouch HSD # 112-4854 with a minimum cycle of 132°C (269°F) with a sterilization time of 5 minutes. You may use an autoclave pouch with comparable materials and the same dimensions.

Look for the temperature symbol engraved on autoclaveable tips. If the tip does not have this symbol, see “Instructions for High Level Disinfection Tips” on page 14.

1 Clean the tip for 2 minutes under running tap water to remove debris.

2 Individually pouch each scanner tip using an autoclave pouch (ex. HSD # 112-4854 or a comparable product).

Note: Autoclave baskets are not indicated for this cleaning procedure.

3 Place one to three pouches per tray or cassette.

4 Select the Wrapped, Wrapped Instruments, or Pouch cycle on the autoclave with a minimum cycle of 132°C (269°F) with a sterilization time of 5 minutes. After cycle completion, store for later use.

Note: Autoclave cycle names differ among manufacturers. Autoclave 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.

5 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.
Instructions for High Level Disinfection Tips

**DO NOT use a chemical sterilant on tips with the autoclave symbol.**
**DO NOT Autoclave tips without the autoclave symbol.**
**DO NOT place in Ultrasonic Cleaner.**

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

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).
   - Agitate the tip in the water for 30 seconds and then let it stand in the water for another 30 seconds.

6. 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.

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

Additional Assistance

Go to http://e4d.com for videos and downloadable documentation. If you have questions, please contact Customer Support at:

Toll Free 800-537-6070
E-mail customersupport@e4d.com
Fax 972-479-1106
Hours of Operation 7 am – 7 pm CT (Monday - Thursday)
8 am – 5 pm CT (Friday)
Web site www.e4d.com
Mailing Address  
D4D Technologies LLC dba E4D Technologies
650 International Pkwy
Richardson, TX 75081 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.

Portable and mobile RF (Radio Frequency) communications equipment can affect medical electrical equipment.

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.

Avoid eye exposure while using the color tip. LEDs contained in this device pulse at a frequency that may elicit reactions in sensitive individuals. These reactions may include seizures.
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.

   **Note:** 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.

   **Note:** The changes are not saved unless Save 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.

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.

**Note:** 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.

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.

   **Note:** 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 Planmeca PlanScan Setup tab.

Setup tab

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.

   **Note:** The Setup tab must be filled out for Margin, Design, and Milling. For Scan Only cases, click the Scan tab at the top to skip the Setup tab.

See the PlanCAD manual for details on filling out the Setup tab.
5 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 12 for more information.

Scanning Tip Sizes

There are three tip options for the scanner. The smaller tips are ideal for molar scanning.

- Standard - 15 x 20 mm
- Landscape - 12.7 x 9.2 mm
- Portrait - 12.5 x 11.8 mm
- Color - 15 x 20 mm

Note: Color scanning requires a Color Activation Kit (sold separately). Contact your local representative for upgrade details.

The live view shows the differences in the scanning tips. The standard tip has a higher focal point and captures more data at once. This can be a problem with active tongues. Landscape has a horizontal field of view and portrait is vertical.

Note: Landscape and portrait tips are compatible with PlanCad 5.5 and later. Call Customer Support for update information 1-800-537-6070.
Scanner Indicators

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

Disconnected
Tip Disconnected
Connected - Cold
Heating - Stage 1
Heating - Stage 2
Ready

Portrait/Landscape Indicators

When a portrait or landscape tip is connected, an icon appears next to the scanner status. Standard tips do not have an orientation icon.

Portrait
Landscape

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 tab is opened or when you click the Refresh icon next to it.

Note: This feature is only available on new tips.

Autoclave Indicator

The autoclave symbol indicates that an autoclave tip is in use.

Color Indicator

The color symbol indicates that a color tip is in use.

Scanning Speed

The speed can be adjusted if desired. Left is slower, right is faster.
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.

Scanning Overview

Scan the restoration site using the Planmeca scanner to capture the image of the tooth (pre-operative or wax-up), preparation, opposing teeth, buccal bite, and/or bite registration. Scanning the restoration site requires proper site preparation, correct placement and movement of the scanner, and a sufficient number of scans to ensure adequate digitalization of the restoration site. The basic steps are:

1. Click the **Scan** tab.
2. Click the desired scanning mode: **Pre-op**, **Prep**, **Bite Registration**, **Opposing**, or **Buccal Bite**.
   - **Pre-op** - Used to utilize the patient’s existing dentition or a wax-up as the pre-op model for creating the restoration.
   - **Prep** - Used to scan the prepared site of the restoration. All free flowing blood, saliva, and
residue should be removed from the preparation site before scanning.

- **Opposing** - Used to scan the teeth on the opposite arch of the preposition. Scan the same number of teeth as the preparation model to ensure good alignment.

- **Buccal** - Scan the buccal view of the preparation, adjacent teeth, and opposing teeth.

- **Bite** - Used if you have produced a bite registration for use in defining the occlusal anatomy. This button is active when Bite Registration is selected on the Setup tab.

3. Shield the site from strong extraneous light sources (dental lights, sunlight, etc.).

4. Click the button on the scanner to activate the laser.

5. The Live View displays the scanning view with live feedback. Place the scanner so that the camera is centered over the occlusal of the restoration site.

   **Note:** The system assumes that the first scan is taken from the occlusal. Ensure the first scan is taken at a 90 degree angle to the occlusal surface. If the first scan is not optimal, delete it and retake it.

6. Continue taking scans until the composite model is fully formed.

7. Click the button on the scanner to deactivate the laser.

8. Evaluate the model. Scan more if needed.

9. Click *Generate Model* or press **M** on the keyboard to finish building the model.

10. Make adjustments as needed.

11. Select the next scan type.

12. Repeat the steps above.

13. Click the *Margin* tab or click the *Next* button when finished with 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.

An audio tone plays to indicate that the system is capturing data. The system changes the Live View to orange and 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 most recent scan added to the model displays with a color coding to indicate the focal distance of the data added.

- Green - close to the tip
- Yellow/Orange - middle of the range
- Red - end of the range (far away from tip)

**Note:** Any color shown means the scanner IS capturing data. The colors only correspond to the focal distance.

The building model rotates to match the Live View.

Click the button on the scanner to stop scanning.

A raw data model is displayed.

Rotate the model to look for low data areas in key areas: the preparation, interproximal contacts, etc..

Fill in missing data where needed.

Click **Generate Model** 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 26 for more information.

For design purposes, you may want to acquire more details of the adjacent teeth. If extra scans are desired, deactivate Data Density View to speed up the process. Reactivate when finished scanning.

**Scanning Options**

**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 will return to the default size next time it is activated.
**Adjust the Scanning Field of View**

The scanning area can be reduced if tongue, cheek, instruments, etc. are interfering with your scans. Most clinical operators do not change the Field of View.

Click and drag the Field of View indicator to the desired setting. The examples below are with the standard tip.

![Field of View Examples](image)

**Evaluating Your Model**

**Checking Your Model For Missing Data**

Click **Data Density View** to evaluate the model for low data. If multiple scans are needed, deactivate this button to speed up the process.

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.

3. If areas lack detail, take additional scans.
With a couple of additional scans, the example is greatly improved.

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

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. With this tool, you can also 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 Pre-op and Bite Registration Time Saver tools (see following sections).

Click the Eraser tool to deactivate it.

Note: Keep some of the buccal or lingual data when erasing. If you disconnect the two halves of the model, half of the model will disappear. It is also recommended that you not delete multiple teeth in a row. Large gaps in the model is not recommended.

Reset Model

Click the Undo Erase 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.
Scanning Occlusion Data

The proposal’s occlusion can be evaluated and designed using:

- Bite registration
- Buccal bite and opposing dentition
- Pre-op (a waxup or existing anatomy before preparation)

Note: Exported cases usually need to include Buccal/Opposing scans.

On the Setup tab, select Bite Registration or Buccal/Opposing. If you are scanning a pre-op, leave the default to Buccal/Opposing.

The system will allow 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 Prep model
- Prep model can be copied into Bite Registration

The instructions below 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 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.
2. Have the patient bite down firmly or press the articulated model down firmly for the impression.

3. 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 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 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.

   **Note:** 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 in the bite registration model color.
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.

---

**Note:** Click Reset if you made a mistake and need to start over.
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

1. On the Setup tab, select **Buccal/Opposing**.

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.

4. 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.

5. 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.

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 the Align Buccal is red, see below for instructions on manually aligning the data.

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.

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, 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 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, or bite registration 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.

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).

**Rotating the Models**

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

*Note:* 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 tab, click **Scan Pre-Op**.

   Scan the pre-operative tooth or wax-up with the same scanning techniques used for the prepared anterior or posterior tooth.

2 Prepare the tooth.

3 On the Scan tab, click **Scan Prep**.

   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.

   **Note:** 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 in the preparation model color.

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

Scanning Impressions

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

---

**Note:** 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 will be 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.

1. On the Scan tab, select **Scan Prep** if it is not already selected. Do NOT select Scan Bite Registration, which resembles an impression.

2. Use the same scan pattern as for an intraoral or a model scan.

3. 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.

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

5. If there are areas that need additional scans, such as the interproximal area shown above, take extra scans.

6. Click **Impression Mode** to invert the model into the normal view. All other tabs will use the inverted model of the impression for creating the proposal.

   **Note:** 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** tab and continue with the normal procedure for drawing the margin and designing the proposal.
6  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

Orientation

The Orientation tool is automatically activated when you first access the Margin tab. For Scan Only cases, this step can be skipped. If you are going to design the case, see the Planmeca PlanCAD manual for more information.

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

Note: 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.

   **Note:** 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.

   **Note:** 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.
   
   **Note:** **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.

**Preview Library**

Click **Preview Library** to display a preview of the library tooth on top of the preparation. The size of the preview tooth is based on the margin. The tooth may appear small on partial restorations. The preview tooth is positioned according to the Orientation. Click Orientation to use the library tooth as a guide to change the model's alignment.
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](image1)
![Margin drawn - With ditching](image2)

**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.
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.

Note: See “Drawing Pontic Margins” on page 44 for information on margins for bridges.

Selection Area Tool

For designing systems only.

5
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.

   **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.
Exporting Data

Note: The screenshots in this chapter are not created by E4D Technologies and may have changed since this manual was published. Please see the Romexis User Manual or www.planmecausasupport.com for more information on Romexis.

There are several methods for sharing digital information using Romexis.

- **CAD/CAM** cases can be transferred between other PlanScan 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**

   Note: 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 Chapter 6.

**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 Chapter 6 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.
   
   Note: 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.

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

   Note: A PlanScan panel is available in the Dentrix Chart. See Dentrix user manual for details and instructions.
Scanner Specifications

Model Number: PlanScan
P/N: 12370003

Electrical Ratings: 12Vdc, 12W

Storage conditions: -29°C to 38°C (-20°F to 100°F)

Operating conditions:
- 20 °C to 28 °C (67.5 °F to 82.5 °F) < 90%
- non-condensing relative humidity
- maximum altitude 6,562 ft (2,000 m)

Dimensions:
- Scanner with tip - 1.9 x 2.1 x 10.9 inches (48 x 53 x 276 mm)
- Scanner without tip - 1.9 x 2.1 x 7.4 inches (48 mm x 53 mm x 188 mm)
- Scanner tip - 1.6 x 1.9 x 4.8 inches (40.5 x 49 x 123 mm)

Weight:
- Scanner with tip - 19 oz (544 g)
- Scanner base - 18 oz (516 g)
- Scanner tip - 1 oz (28 g)

Cables

When connecting components, ensure you use only the cables provided with the system. The following cables were provided with the scanner.

Scanner Connecting Cable: IEEE 1394b Fire Wire Cable, Length 2M, shielded
FireWire to Thunderbolt Adaptor Cable: Shielded, Length 0.2M

Applicable Standards

Product Safety

ANSI/AAMI ES60601-1:2005
IEC 60601-1, 3rd Edition

EMC

IEC 60601-1-2
US FCC CFR 47, Part 15

Laser Product Safety

IEC 60825-1
Packaging and Environmental
ISTA Class 2A

Biocompatibility
ISO 10993

European Standards
EN 60601-1:2006
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. 60601-1:2008
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)

<table>
<thead>
<tr>
<th>North America</th>
<th>Product Safety Mark (NRTL) - UL C/US</th>
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</thead>
<tbody>
<tr>
<td>International</td>
<td>CB Scheme Product Safety Test Certificate (UL)</td>
</tr>
<tr>
<td></td>
<td>CB Scheme EMC Test Certificate (NEMKO)</td>
</tr>
<tr>
<td></td>
<td>CE Mark (TUV)</td>
</tr>
<tr>
<td>Quality System Certifications</td>
<td>ISO 13485 Registered Firm</td>
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<tr>
<td></td>
<td>Japan GMP</td>
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</tbody>
</table>


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

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

**Guidance and Manufacturer’s Declaration - Electromagnetic Immunity**

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

<table>
<thead>
<tr>
<th>Immunity Test</th>
<th>IEC 60601 Test Level</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD)</td>
<td>+/- 6 kV contact</td>
<td>+/- 6 kV contact</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with</td>
</tr>
<tr>
<td>IEC 61000-4-2</td>
<td>+/- 8 kV air</td>
<td>+/- 8 kV air</td>
<td>synthetic material, the relative humidity should be at least 30%</td>
</tr>
<tr>
<td>Electrical fast transient /</td>
<td>+/- 2 kV for power</td>
<td>Not applicable</td>
<td>Mains power quality should be that of a typical commercial or hospital</td>
</tr>
<tr>
<td>burst IEC 61000-4-4</td>
<td>supply lines</td>
<td></td>
<td>environment</td>
</tr>
<tr>
<td></td>
<td>+/- 1 kV for input/ output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunity Test</td>
<td>IEC 60601 Test Level</td>
<td>Compliance Level</td>
<td>Electromagnetic Environment - guidance</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Surge</td>
<td>+/- 1 kV differential mode</td>
<td>Not applicable</td>
<td>Mains power quality should be that of a typical commercial or hospital environment</td>
</tr>
<tr>
<td></td>
<td>+/- 2 kV common mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage dips, short interruptions and voltage variations on power supply input lines</td>
<td>&lt;5% Ut (&gt;95% dip in Ut) for 0.5 cycle</td>
<td>Not applicable</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td></td>
<td>40% Ut (60% dip in Ut) for 5 cycles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>70% Ut (30% dip in Ut) for 25 cycles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;5% Ut (&gt;95% dip in Ut) for 5 sec.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power frequency (50/60 Hz) Magnetic field</td>
<td>3 A/m</td>
<td>3 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
</tbody>
</table>

Note: Ut is the a.c. mains voltage prior to application of the test level.
<table>
<thead>
<tr>
<th>Immunity Test</th>
<th>IEC 60601 Test Level</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF</td>
<td>IEC 61000-4-6</td>
<td>3 Vrms 150 kHz to 80 MHz</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Radiated RF</td>
<td>IEC 61000-4-3</td>
<td>3 V/m 80 MHz to 2.5 GHz</td>
<td>3 V/m</td>
</tr>
</tbody>
</table>

\[
d = 12\sqrt{P}, \quad 80 \text{ MHz to } 800 \text{ MHz} \\
d = 23\sqrt{P}, \quad 800 \text{ MHz to } 2.5 \text{ GHz}
\]

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, should be less than the compliance level in each frequency range.

Interference may occur in the vicinity of equipment marked with the following symbol:

![Symbol]

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 PlanScan is used exceeds the applicable RF compliance level above, the PlanScan should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the PlanScan.

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

## Recommended Separation Distances

### Recommended separation distances between portable and mobile RF communications equipment and the PlanScan

The PlanScan is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the PlanScan can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the PlanScan as recommended below, according to the maximum output power of the communications equipment.
Recommended separation distances between portable and mobile RF communications equipment and the PlanScan

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter W</th>
<th>Separation distance according to frequency of transmitter m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150 kHz to 80 MHz</td>
</tr>
<tr>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>0.1</td>
<td>0.38</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>10</td>
<td>3.8</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
</tr>
</tbody>
</table>

For transmitters rated at a maximum output power not listed above, the recommended separation distance \( d \) in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where \( P \) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for 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.

PlanScan 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 4.95 mW
Wavelength 450 nm
Beam divergence 10 degrees

\(^a\) Laser product classified to standard IEC/EN 60825-1:2007-03 Ed. 2.0

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.
## Symbols

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="EC REP" /></td>
<td>Authorized Representative in the European community</td>
</tr>
<tr>
<td><img src="image" alt="Class 2" /></td>
<td>Class 2 electrical product</td>
</tr>
<tr>
<td><img src="image" alt="Date of Manufacture" /></td>
<td>Date of Manufacture</td>
</tr>
<tr>
<td><img src="image" alt="DC Current" /></td>
<td>DC Current</td>
</tr>
<tr>
<td><img src="image" alt="Waste" /></td>
<td>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 E4D Technologies for reprocessing. For more information about where you can send your waste equipment for recycling, please contact your local city office or E4D Technologies.</td>
</tr>
<tr>
<td><img src="image" alt="European conformity" /></td>
<td>European conformity</td>
</tr>
<tr>
<td><img src="image" alt="General mandatory action" /></td>
<td>General mandatory action</td>
</tr>
<tr>
<td><img src="image" alt="General warning" /></td>
<td>General warning</td>
</tr>
<tr>
<td><img src="image" alt="Laser warning" /></td>
<td>Laser warning</td>
</tr>
<tr>
<td><img src="image" alt="Lot number" /></td>
<td>Lot number</td>
</tr>
<tr>
<td><img src="image" alt="Mandatory Safety ISO 7010-M002" /></td>
<td>Mandatory Safety ISO 7010-M002</td>
</tr>
<tr>
<td><img src="image" alt="Manufacturer" /></td>
<td>Manufacturer</td>
</tr>
<tr>
<td><img src="image" alt="Catalog number" /></td>
<td>Catalog number</td>
</tr>
<tr>
<td><img src="image" alt="Serial number" /></td>
<td>Serial number</td>
</tr>
<tr>
<td><img src="image" alt="Standby IEC 60417-5010" /></td>
<td>Standby IEC 60417-5010</td>
</tr>
<tr>
<td><img src="image" alt="Type B Applied Part IEC 60417-5840" /></td>
<td>Type B Applied Part IEC 60417-5840</td>
</tr>
</tbody>
</table>
Firewire Warning Label

There is a warning label near the Firewire connection.

Product Identification Labels

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

Note: If any of the labels are missing or illegible, please contact Planmeca After Sales for replacement labels.

Note: The labels may have changed since this book was published.
External Components and Connectors

When connecting external components to the E4D system, attach only components that have been tested for compliance with IEC 60601-1 or UL 60950.

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

**Internal Fuse**

FS2 - 1.5A/63V/FF/50A IR

**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
If you have questions, please contact Customer Support at

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Toll Free</td>
<td>800-537-6070</td>
<td></td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:customersupport@e4d.com">customersupport@e4d.com</a></td>
<td></td>
</tr>
<tr>
<td>Fax</td>
<td>972-479-1106</td>
<td></td>
</tr>
<tr>
<td>Hours of Operation</td>
<td>7 am – 7 pm CT (Monday - Thursday)</td>
<td>8 am – 5 pm CT (Friday)</td>
</tr>
<tr>
<td>Web site</td>
<td><a href="http://www.e4d.com">www.e4d.com</a></td>
<td></td>
</tr>
</tbody>
</table>

Mailing Address
D4D Technologies LLC dba E4D Technologies
650 International Pkwy
Richardson, TX 75081 USA

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