The manufacturer, assembler, and importer are responsible for the safety, reliability and performance of the unit only if:

- Installation, calibration, modification and repairs are carried out by qualified authorized personnel.
- Electrical installations are carried out according to the appropriate requirements such as IEC364.
- Equipment is used according to the operating instructions

Planmeca pursues a policy of continual product development. Although every effort is made to produce up-to-date product documentation this publication should not be regarded as an infallible guide to current specifications. We reserve the right to make changes without prior notice.
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Intra Phone Jack Wire Diagram

Intra Generator Board

+VCC and EXP are used for a remote exposure switch

Back side of the wall plate

Wiring Guide
+12v – Black
EXP – Red
GND – Green
SCL – Yellow

Note: Blue and white terminals are not used.
Optional remote exposure switch

Set exposure terminal to ON

Set buzzer to OFF (ON if desired)
Intra Wire Diagrams

Single exposure button
(Fixed Control Panel Only)

Double button exposure
(Requires both buttons to be pressed simultaneously for exposure)
IMPORTANT !!!

Planmeca Intra is factory pre-programmed for short cone and F-speed film (i.e. Kodak Insight film)

To change the preset density settings (film type):
The density setting will determine how dark the image will be. Changing the density setting is a quick way of adjusting all the pre-set buttons at once for a specific film in use.

1. Turn the x-ray off / on.
2. Turn off the bitewing button (no green light).
3. Press the SELECT key for 5 secs until time display flashes.
4. Press the SELECT key briefly once. The kV display should now flash.
5. Press the SELECT key briefly once. The mA display should now flash.
6. Press the SELECT key briefly once. The time display will now show the density setting.
7. Use UP/DOWN arrows to adjust density setting (see table below).
8. Press the SELECT key for 5 seconds to return back to user mode.

<table>
<thead>
<tr>
<th>Film Type</th>
<th>Short Cone</th>
<th>Long Cone</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-speed film</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>E-speed film</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>F-speed film</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

For digital sensor and phosphor plate applications, change the x-ray to the correct mode before adjusting density settings.

NOTE: Press MODE key for 4 seconds to change to Phosphorus plate (P) and digital (d).

To change individual preset button settings:
1. Activate the button that you want to program.
2. Press the SELECT key for 5 secs until time display flashes.
3. Set the time to desired value with UP/DOWN arrows.
4. Press the SELECT key briefly once.
5. Set the kV to the desired value with UP/DOWN arrows.
6. Press the SELECT key briefly once.
7. Set the desired mA value with UP/DOWN arrows.
8. Press the SELECT key for 5 secs to return back to user mode.

NOTE: To program multiple buttons individually, repeat the steps 1-7.
## Factory Default Settings For the Planmeca Intra (3.06)

### Film

<table>
<thead>
<tr>
<th>Adult</th>
<th>kV</th>
<th>mA</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitewing</td>
<td>63</td>
<td>8</td>
<td>0.08</td>
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<tr>
<td>Endo</td>
<td>60</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Upper Occlusal</td>
<td>70</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Lower Occlusal</td>
<td>70</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Upper Centrals</td>
<td>60</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Lower Centrals</td>
<td>60</td>
<td>8</td>
<td>0.064</td>
</tr>
<tr>
<td>Upper Pre-molar</td>
<td>63</td>
<td>8</td>
<td>0.08</td>
</tr>
<tr>
<td>Lower Molars</td>
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<td>8</td>
<td>0.08</td>
</tr>
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</table>

<table>
<thead>
<tr>
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<th>kV</th>
<th>mA</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>66</td>
<td>8</td>
<td>0.064</td>
</tr>
<tr>
<td>Lower Occlusal</td>
<td>66</td>
<td>8</td>
<td>0.064</td>
</tr>
<tr>
<td>Upper Centrals</td>
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<td>8</td>
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<td>60</td>
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<td>0.064</td>
</tr>
<tr>
<td>Lower Molars</td>
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### Digital

<table>
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<th>mA</th>
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<td>8</td>
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<tr>
<td>Lower Occlusal</td>
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<td>Upper Centrals</td>
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<td>8</td>
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<tr>
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<table>
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<th>mA</th>
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<td>0.04</td>
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<tr>
<td>Lower Molars</td>
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<td>8</td>
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### Phosphorus

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<th>mA</th>
<th>Time</th>
</tr>
</thead>
<tbody>
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<td>0.32</td>
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<td>Upper Occlusal</td>
<td>70</td>
<td>8</td>
<td>0.32</td>
</tr>
<tr>
<td>Lower Occlusal</td>
<td>70</td>
<td>8</td>
<td>0.32</td>
</tr>
<tr>
<td>Upper Centrals</td>
<td>60</td>
<td>8</td>
<td>0.32</td>
</tr>
<tr>
<td>Lower Centrals</td>
<td>60</td>
<td>8</td>
<td>0.25</td>
</tr>
<tr>
<td>Upper Pre-molar</td>
<td>63</td>
<td>8</td>
<td>0.32</td>
</tr>
<tr>
<td>Lower Molars</td>
<td>63</td>
<td>8</td>
<td>0.32</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Child</th>
<th>kV</th>
<th>mA</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitewing</td>
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<td>0.25</td>
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<tr>
<td>Endo</td>
<td>60</td>
<td>8</td>
<td>0.25</td>
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<tr>
<td>Upper Occlusal</td>
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<td>8</td>
<td>0.25</td>
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<tr>
<td>Lower Occlusal</td>
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<td>Upper Centrals</td>
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</tr>
<tr>
<td>Lower Molars</td>
<td>60</td>
<td>8</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Intra Invasive kV/mA Test

NOTE: Time must be set above 0.200 seconds to be able to get a reading.

**kV**
On the tubehead pcb P1 connector, measure DC volts between pins 1&2 during exposure. The reading should be:

\[ \text{kV} \times 0.04614 = \text{Volts} \pm 10\% \]

**mA**
On the tubehead pcb P1 connector, measure DC volts between pins 3&4 during exposure. The reading should be:

\[ \text{mA} \times 0.4 = \text{Volts} \pm 10\% \]
<table>
<thead>
<tr>
<th>ERROR CODE</th>
<th>ERROR MESSAGE EXPLANATION</th>
</tr>
</thead>
</table>
| E.00       | *Exposure key was released too early during the exposure.*  
  | - check the control panel cable, telephone cable, and the arm cable.  
  | - replace the control panel or use another exposure switch. |
| E.10       | *X-ray tube Anode voltage (kV) overshoot.*  
  | - run an preheat cal  
  | - replace tubehead pcb, tubehead, then generator board. (this order) |
| E.11       | *X-ray tube Anode voltage (kV) dropped suddenly.*  
  | - run an preheat cal  
  | - replace tubehead pcb, tubehead, then generator board. (this order) |
| E.12       | *X-ray tube cathode filament preheating voltages are not calibrated.*  
  | - run an preheat cal  
  | - replace tubehead pcb, tubehead, then generator board. (this order) |
| E.13       | *Filament preheating voltage calibration failed.*  
  | - do preheat again  
  | - replace tubehead pcb, tubehead, feedback cable |
| E.29/36/57 | *Membrane keyboard key short-circuited/ pressed during self test or faulty display board.*  
  | - press Select to see re-occurs, if so replace membrane.  
  | - replace membrane then control panel (this order) |
| E.30/34    | *kV value does not reach or it exceeds the given value (difference more than 5%).*  
  | - check incoming mains voltage (must be +/- 5% of 110)  
  | - run an preheat cal, check feedback cable, check arm cable.  
  | - replace generator pcb, tubehead pcb, tubehead (this order) |
| E.31/33    | *X-ray tube Anode current (mA) missing, or not in specified limits.*  
  | - run preheat cal, check feedback cable, arm cable.  
  | - replace tubehead pcb, tubehead (this order) |
| E.33       | *X-ray tube Filament voltage (V) missing, or outside the range (too low or too high).*  
  | - see above |
| E.34       | *X-ray tube Anode voltage (kV) missing, or below the specified limit.*  
  | - see above |
| E.36       | *Too long of an exposure.*  
  | - switch out control panel  
  | - replace membrane, control panel, tubehead pcb. (this order) |
| E.37       | *kV feedback signal open circuit or short circuit.*  
  | - check arm cable, check feedback cable, flip feedback cable over.  
  | - replace tubehead pcb, tubehead. (this order) |
| E.38       | *mA feedback signal open circuit or short circuit.*  
  | - check arm cable, check feedback cable, flip feedback cable over  
<p>| - replace tubehead pcb, tubehead. (this order) |</p>
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.50</td>
<td>Tube head temperature sensor short circuit.</td>
<td>- check feedback cable, flip feedback cable over.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- replace tubehead</td>
</tr>
<tr>
<td>E.51</td>
<td>Tube head temperature sensor open circuit.</td>
<td>- check arm cable, check feedback cable, flip feedback cable over</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- replace tubehead pcb, tubehead. (this order)</td>
</tr>
<tr>
<td>E.52</td>
<td>Filament voltage feedback not in specified limits.</td>
<td>- check arm cable, check feedback cable, flip feedback cable over</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- replace tubehead pcb, tubehead. (this order)</td>
</tr>
<tr>
<td>E.57</td>
<td>Exposure key pressed during self test.</td>
<td>- see above</td>
</tr>
<tr>
<td>E.60</td>
<td>+/- 15VDC voltage is out of limits.</td>
<td>- after turning on, replace tubehead pcb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- after start of exposure, measure 12v on gen board. If drops replace gen board.</td>
</tr>
<tr>
<td>E.61</td>
<td>Communication error between control panel and tube head CPU.</td>
<td>- check arm cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- check D7 on tubehead pcb:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* if bright, replace tubehead pcb.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* if not on, replace arm cable.</td>
</tr>
<tr>
<td>E.71</td>
<td>FLASH memory check-sum error (tube head CPU).</td>
<td>- replace tubehead pcb</td>
</tr>
<tr>
<td>E.81</td>
<td>EEPROM memory defective (tube head CPU).</td>
<td>- replace tubehead pcb</td>
</tr>
<tr>
<td>E.83</td>
<td>Config register error (tube head CPU)</td>
<td>- replace tubehead pcb</td>
</tr>
<tr>
<td>RECALLING THE FACTORY PRESETS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Press an hold down any of the preprogrammed setting keys when switching the unit on. The error code E.29 will appear on the time display. (Figure 1)

**Figure 1**

**Do not** clear the error code by pressing the “Select” key but press the Occlusal exposure key for 6 seconds. (Figure 2). The factory presets have been recalled.

**Figure 2**
Proline
Setting Time and Date

Proline XC:

Press i

Press Time and date adjustment

1. Time (24hr clock)
   a. First is minutes, adjust up or down to proper minutes then press Next
      i. Adjusts second minute number then first minute number
      IE: if x:34, adjusts up or down for the 4, press Next and then up or down for
         the 3 then press Next
   b. Second is hours, adjust up or down to proper hour then press Next

2. Date (Day, Month, Year)
   a. Third is days, adjust up or down to proper day then press Next.
   b. Fourth is month, adjust up or down to proper month then press Next.
   c. Fifth is year
      i. Adjusts first number of year then press Next to move onto the second, third
         and fourth number of the year.

Press OK to save the time and date.

Proline CC/EC:

1. Press the CTL button once and let go.
2. Press the Clock button once and let go.
   NOTE: Time will flash right to left and be in 24 hour time.

3. Use the Up and Down arrows to adjust the number.
4. Press the Clock button once to move to the number.
   NOTE: The date goes: Day, Month, Year.

5. Press the Ready/Prep button to finish and save the time and date
Proline Dimensions

NOTE: If the unit is to be used with the free-standing base (part number 50021) the total height will be 2230mm (88in)
CC/EC Beam Alignment

CC:

**PAN**
1. Hold CTL and CEPH key for 6 seconds.
2. Press CTL once let go, and then press the Collimator Selection key let go.
3. Press Exposure button to check beam.
4. If the beam is too left/right, use the mm +/- to move the beam. (Figure 4)

**NOTE:** The beam will not move while exposing. Adjust the beam and then press the exposure button to check alignment.

5. Press the Collimator Selection key once to save changes.

**NOTE:** Pressing the Clock key will also advance the collimator to next available beam position.

6. Press CTL then the Collimator Selection key to exit beam alignment mode.
7. Press the CEPH key to exit Service mode.

**CEPH**
1. Hold CEPH.
2. Follow the Pan instructions.

EC:

**PAN**
1. Hold CTL and **Hidden** key for 6 seconds to enter service mode.
2. Press CTL once let go, and then press the Clock key let go to enter beam alignment mode.
3. Press Exposure button to check beam
4. If the beam is too left/right, use the mm +/- to move the beam

**NOTE:** The beam will not move while exposing. Adjust the beam and then press the exposure button to check alignment.

5. Press the Clock key once to save any changes.

**NOTE:** Pressing the Clock key will also advance the collimator to next available beam position.

6. Press **CTL** then the **Clock** key to exit beam alignment mode
7. Press the **Hidden** key to exit Service mode.

**CEPH**
1. Hold P, press exposure +/- to select Ceph collimator 4, 5, or 6. Let go of P.
2. Follow Pan instructions.
Proline PCBs

CC/EC Film

Keyboard Processor
665070
(3.51KP/2.07GP or earlier)

Generator Processor
665180

Power Generator
662051

Low Voltage PCB
471023

Tube head
10010517

CC/EC Digital

Keyboard Processor
10002568
(Proline 5.x to 6.x)

XEC/XC

Keyboard Processor
10009419

Generator Processor
10009814

Proline PSU PCB
10009812

Tube head
10010470 &
10010471

10010517 = before XEC421512 w/ cables
10010327 = after XEC421512
## Software Version/Compatibility

<table>
<thead>
<tr>
<th>Generator Processor PCB</th>
<th>665069 Version –B6 or older “one big software chip”</th>
<th>665180 Version –C or later “one small software chip”</th>
<th>665181 Version –C or later “one small software chip”</th>
<th>10009814 New EMC PCB 105-10-28 “one small software chip”</th>
</tr>
</thead>
<tbody>
<tr>
<td>665070 Version –B2 or older “Two big software chips (PK0 / PK1)”</td>
<td>PM 2002 Proline: PK0 1.67/PK1 1.67 &amp; PG1.69</td>
<td>No compatible PCBs</td>
<td>No compatible PCBs</td>
<td>No compatible PCBs</td>
</tr>
<tr>
<td>10002568 Version –L or later “One small software chip” / “Dimax3 compatible”</td>
<td>No compatible PCBs</td>
<td>Film: PK6.00 &amp; PG6.00 Dimax 2/3: PK5.15 &amp; PG5.15</td>
<td>No compatible PCBs</td>
<td>No compatible PCBs</td>
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<tr>
<td>10009419 New EMC PCB 105-10-27 “one small software chip” / “Dimax3 compatible”</td>
<td>No compatible PCBs</td>
<td>Film: PK6.00 &amp; PG6.00 Dimax 2/3: PK5.15 &amp; PG5.15</td>
<td>No compatible PCBs</td>
<td>Film: PK6.60 &amp; PG6.53 Dimax 2/3: PK5.61 &amp; PG5.60</td>
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</table>
## CC User/Service Mode Functions

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<td><strong>AUTOMATIC RETURN</strong></td>
<td>![CTL] → ![Temp] (hold for 3 seconds)</td>
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<td><strong>TEMPLE REST MOTOR</strong></td>
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<td><strong>AUTOMATIC TEMPLE REST CLOSING</strong></td>
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</tr>
<tr>
<td><strong>WARNING TONE ADJUSTMENT</strong></td>
<td>![CTL] → ![P] → ![up] → ![down] → ![READY PRINT]</td>
</tr>
<tr>
<td><strong>EXPOSURE HISTORY</strong></td>
<td>![CTL] → ![up] → ![down] → ![READY PRINT]</td>
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<tr>
<td><strong>AUTOPRINT SETTINGS</strong></td>
<td>![CTL] → ![AUTO] (hold for 3 seconds) → ![up] → ![down] → ![READY PRINT]</td>
</tr>
<tr>
<td><strong>ENTER SERVICE MODE</strong></td>
<td>![CTL] + ![CEPH] (hold both for 6 seconds) → ![CEPH] (Press to exit)</td>
</tr>
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</table>

- **USER SETTINGS**
- **KEY SEQUENCE**
  - TIME & DATE ADJUSTMENT: Enter the time and date using the up and down arrows.
  - AUTOMATIC RETURN: Hold the CTL button for 3 seconds.
  - TEMPLE REST MOTOR: Hold the TEMPLE button for 4 seconds.
  - AUTOMATIC TEMPLE REST CLOSING: Enter the AUTO mode and hold for 4 seconds.
  - RADIAITON ON/OFF: Adjust the radiation by pressing the up and down arrows.
  - WARNING TONE ADJUSTMENT: Adjust the warning tone by pressing the up and down arrows.
  - EXPOSURE HISTORY: Enter the exposure history and view by pressing the up and down arrows.
  - AUTOPRINT SETTINGS: Set the time and date format by holding the CTL button for 3 seconds.
  - ENTER SERVICE MODE: Press CEPH to enter service mode and hold both for 6 seconds.
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**DISPLAY EXPOSURE COUNTER**

- **KEY SEQUENCE**
  - **CTL** ➔ **P** ➔ **Total** OR **OR** ➔ **Cephs**

**DISPLAY ERROR HISTORY**

- **KEY SEQUENCE**
  - **CTL** ➔ **READY** ➔ **PRET** ➔ **up** ➔ **down** ➔ **CTL**
  - **Exp. Time** = Error Code
  - **kV** = Day
  - **mA** = Month

**BEAM ALIGNMENT**

- **KEY SEQUENCE**
  - **hold for 4 seconds**

**ACTIVATE REMOTE READY LIGHT**

- **KEY SEQUENCE**
  - **hold for 4 seconds**

**ZERO THE CHINREST**

- **KEY SEQUENCE**
  - **hold for 4 seconds**

**PANORAMIC/CEPHALOSTATIC SETUP**

- **EC ↔ CC**
  - **KEY SEQUENCE**
    - **CTL** ➔ **-** ➔ **+**
    - **hold for 10 seconds**

**PROLINE ↔ NON-PROLINE**

- **KEY SEQUENCE**
  - **CTL** ➔ **-** ➔ **+**
  - **hold for 4 seconds**

**FILAMENT DEFINITION**

- **KEY SEQUENCE**
  - **CTL** ➔ **EXP** ➔ **hold until finished**

**SOFT TISSUE FILTER POSITIONING LIGHT**

- **KEY SEQUENCE**
  - **AUTO** ➔ **P** ➔ **hold for 2 seconds**

- **EC** = Pan/Ceph
- **PA** = Pan Only
Er. 26/40 Troubleshooting

NOTE: Turn off the radiation before starting.

Part 1:

Is this a brand new installation?

Go to Part 2: Adjusting Rotating Guidance Plate

Remove the front tubehead cover and C-arm lower cover.
Unscrew the four 2.5mm allen screws holding the Generator Processor board up.

Using a 6mm allen, remove the spring from the rotating motor.

Remove the 3mm allen screw and lower the motor down.
Mark (1) the wheel and then turn the shaft of the motor (2) so that the wheel makes a full revolution.

Did the shaft bind at any time?

The gears inside the gearbox have cracked. Open the gearbox to confirm.

You would see cracks on the wheel if the it is broken.
Lower the unit down then open the board cover on the top of the upper shelf.

Remove the spring by using a flathead screwdriver to pry the ball end off.

Do the same to the other end of the shaft.
Make sure the inner shaft slides easily into the outer shaft. Lubricate or replace if necessary. Part number for the spring is 665010.

Also make sure that the shafts are tight to the ball joint.

Reinstall the spring and test the rotation.

If Er.26 or 40 occurs again go to Part 2: Adjusting Rotating Guidance Plate.
Part 2: Adjusting Rotating Guidance Plate

Rotate the rotating arm to the mid-point of the rotating cycle.

Do not move the arm manually!!!!

If the arm does not move to that position with the motor, go on these instructions to remove the spring of the rotating motor.

After this the arm can be move manually, but do it carefully.

Remove the front tubehead cover and C-arm lower cover. (Figure 1a-c)
Unscrew the four 2.5mm allen screws holding the Generator Processor board up.

Using a 6mm allen, remove the spring from the rotating motor.

Remove the 3mm allen screw and lower the motor down.
Lock the rotating arm into the mid-position using the shipping pin. If not available, use a 6mm allen wrench.

Loosen the 6mm allen screws no more than one full turn. They are very tight. **Do not** use ball end of wrench because it will break off.

Push the rotating arm according to arrow 1. May not move but ensures that guidance wheel is in tight contact with the rotating groove.

Push one of the 6mm allen screws towards the cassette/sensor holder using about 2lbs of force. Tighten the screw down while still applying the pressure. Repeat with the other screw.

This will align the rotating guidance plate tight against the rotating slide groove.

Sometimes this adjustment needs to be done a couple of times before it is right.

To test:
- reinstall the motor spring back.
- Remove the shipping pin
- Replace the circuit board.
- Take a test exposure
Proline XC Internal Wire Diagram
Proline EC Internal Wire Diagram
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<th>HELP MESSAGE EXPLANATION</th>
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<td>The key has no function in this mode.</td>
</tr>
<tr>
<td>HE 1</td>
<td>The key has no function with the control key</td>
</tr>
<tr>
<td>HE 2</td>
<td>The error code must first be cleared from the display by pressing CTL key.</td>
</tr>
<tr>
<td>HE 3</td>
<td>The unit must be driven to the ready position with the special program keys (in Transversal slicing system mode).</td>
</tr>
<tr>
<td>HE 4</td>
<td>The patient positioning mechanism can be moved only in the manual transversal slicing system mode.</td>
</tr>
<tr>
<td>HE 5</td>
<td>You are using a wrong secondary slot. Select another slot.</td>
</tr>
<tr>
<td>HE 6</td>
<td>The temple support motor has been inactivated. The temple support movement does not operate.</td>
</tr>
<tr>
<td>HE 7</td>
<td>The X-ray unit is not equipped with a Cephalostat.</td>
</tr>
<tr>
<td>HE 8</td>
<td>You cannot change the horizontal segment; there is only one primary slot in panoramic mode. In Transversal slicing system mode the primary slot is selected automatically.</td>
</tr>
<tr>
<td>HE 9</td>
<td>The soft tissue filter cannot be moved when taking a posterior-anterior or anterior-posterior exposure.</td>
</tr>
<tr>
<td>HE 10</td>
<td>The X-ray unit is busy, wait until the previous function is completed.</td>
</tr>
<tr>
<td>HE 15</td>
<td>The x-ray unit is not communicating with the PC, e.g. the Dimaxis software is not running.</td>
</tr>
<tr>
<td>HE 16</td>
<td>The patient is not selected in the Dimaxis software.</td>
</tr>
<tr>
<td>HE 17</td>
<td>The sensor head is not in its position.</td>
</tr>
<tr>
<td>HE 18</td>
<td>In the Cephalometric mode there is also a sensor head in the rotating unit in addition to the sensor head attached to the cephalostat. Remove the sensor head from the rotating unit.</td>
</tr>
<tr>
<td>HE 19</td>
<td>The unit exposure mode (panoramic/Cephalometric) differs from the mode selected in the Dimaxis software.</td>
</tr>
<tr>
<td>ERROR CODE</td>
<td>ERROR CODE EXPLANATION</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------</td>
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</tbody>
</table>
| Er 00      | The exposure switch was released too early during exposure.  
|            | - take an exposure in Service Mode |
| Er 01      | Short loss of power or drop in line voltage.  
|            | - turn unit off, count to 10 then turn on. |
| Er 04      | The cassette carriage not in ready position when the exposure was pressed.  
|            | - check friction strip, cassette motor. |
| Er 07      | The rotating unit is not in the ready position.  
|            | - check that program selection is complete |
| Er 08      | Panoramic sensor is in the Cephalometric sensor holder.  
|            | - Pan sensor is in Ceph sensor holder |
| Er 10      | Overvoltage in tubehead. (Tubehead arching)  
|            | - check tubehead, generator processor, power generator board  
|            | (this order) |
| Er 11      | Sudden kilovolt drop.  
|            | - if knocking heard, replace tubehead  
|            | - check voltages to generator processor, if good replace generator board, if bad replace cabling. |
| Er 12      | Filament definition is not performed.  
|            | - run a filament definition |
| Er 15      | The patient positioning mechanism not calibrated.  
|            | - run the mm/layer forward and back to limits. |
| Er 20      | Tube power generator time out. The exposure time is longer than a specified time.  
|            | - check cables to generator board, if good replace generator board, if bad replace cabling. |
| Er 21      | Up/down motor time out. The vertical carriage does not reach the limit sensor within a specified time.  
|            | - check keypad, limit sensor, z-motor. (replace this order) |
| Er 22      | Temple rest motor time out.  
|            | - check service settings, cabling, motor. (replace this order) |
| Er 23      | Layer adjust motor time out. The layer mechanism does not reach the limit sensor with a specified time.  
|            | - check keypad, limit sensor, layer motor. (replace this order) |
| Er 24      | Primary slot motor time out. The slot mechanism does not reach the sensor in a specified time.  
|            | - check service settings, cables, collimator, generator board.  
|            | (replace this order) |
| Er 25      | Cassette motor time out. The cassette holder mechanism does not reach the limit sensor within a specified time.  
|            | - check sensor magnets, friction strip, cassette motor  
|            | (replace this order) |
| Er 26      | Rotation motor time out. The rotating unit does not reach limit sensor in a specified time.  
<p>|            | - check cables, rotation motor, guide plate, guide block strip |</p>
<table>
<thead>
<tr>
<th>ERROR CODES</th>
<th>ERROR CODES EXPLANATION</th>
</tr>
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</table>
| Er 27       | Cephalostat scanning mechanism time out.  
- check drive mechanism, limit sensor, cabling |
| Er 28       | Panoramic sensor head time out. 
- check cabling, sensor motor, generator processor |
| Er 30/31/32/33 | kV value does not reach given value.  
- run fd  
- if fail, replace tubehead, generator pcb, and power generator board. (this order) |
| Er 31       | mA value does not reach given value.  
- see above |
| Er 32       | Tube filament control inoperative.  
- see above |
| Er 33       | Tube filament control inoperative.  
- see above |
| Er 40       | The rotation does not reach the end limit sensor.  
- check cables, rotation motor, guide plate, guide block strip |
| Er 41       | Rotation goes over the end limit sensor.  
- check limit sensor, generator processor, guide block |
| Er 42       | Secondary slot not in the position for the panoramic exposure.  
- check cabling, check locking solenoid |
| Er 43       | Secondary slot not in the position for the Cephalometric exposure.  
- check the cassette magnets |
| Er 44       | The patient positioning mechanism zero point is set incorrectly.  
- reset mm to zero |
| Er 45       | The soft tissue filter position is not calibrated.  
- calibrate soft tissue filter |
| Er 50       | The temperature of the tubehead is too low.  
- check cabling, power generator board, generator board, tubehead  
- if CC/EC check low voltage board also |
| Er 51       | Temperature sensor is open.  
- check tubehead ground cable  
- replace tubehead |
| Er 52       | mA or kV feedback cable is open.  
- check cabling, generator board |
| Er 53/54    | Up/down motor does not consume power.  
- check the z-motor connections, counterweights, service setting power consumption. |
| Er 54       | Up/down motor consumes too much power.  
- see above |
| Er 57       | Exposure button is activated when the unit is turned on.  
- check exposure switch, planet cable, planet cable connector, keyboard processor |
| Er 60       | Generator processor power is too low.  
- check voltages, must be 12v. if not replace board.  
- Check cabling, must be 12v. If not check keyboard processor. Replace cabling then keyboard. |
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| Er 61       | Processor communication error.  
- check cables, check connections, check voltages, check chip versions. |
| Er 64/65    | The radiation reaching the AEC sensor is very low or missing.  
- recalibrate AEC sensor |
| Er 65       | The radiation reaching the AEC sensor is too high.  
- see above |
| Er 70       | Processor communication error.  
- check chip version compatibility |
| Er 71/72    | Generator processor program memory failure.  
- check software chip, replace chip |
| Er 72       | Keyboard processor program memory failure.  
- see above |
| Er 73/74/75/80/82 90/91/99 | Keyboard processor program error.  
- replace keyboard processor |
| Er 74       | Keyboard processor operating improperly.  
- see above |
| Er 75       | Keyboard processor operating improperly.  
- see above |
| Er 80       | Keyboard processor EEPROM failure.  
- see above |
| Er 81/83    | Generator processor EEPROM failure.  
- replace generator processor |
| Er 82       | Keyboard processor configuration error.  
- see above |
| Er 83       | Generator processor configuration error.  
- see above |
| Er 84       | Tube power generator time out.  
- replace power generator board |
| Er 90       | Keyboard processor EEPROM is not activated.  
- see above |
| Er 91       | Keyboard processor stack overflow.  
- see above |
| Er 99       | Error code generator error.  
- see above |
Proline XC Invasive Testing

1. Filament Definition (Preheat calibration)

Press the i button in the lower left corner.

Press Service Settings.

NOTE: Password is 1701.

Page down to Tube Type.

Press Reset then hold the exposure button down until all the exposure have been taken.

Press OK twice to get back to the home screen. (See Figure 4)

2. Removing Covers

Unscrew the four 3mm allen screws on the back of the tubehead and remove the front tubehead cover. (Figure 5)

Unhook the two edges of the inner C-arm cover and remove the inner cover. (Figure 6a-b)
3. **Connecting Cables**

Touch the Positive (Black) plug of the multi-meter to the P18 connectors KVM on the Generator Processor board. (Figure 7)

![Figure 7](image)

Touch the Negative (Red) plug of the multi-meter to the P18 connectors GND on the Generator Processor board. (See Figure 7)

**NOTE:** To check mA use the MAM (Black) and GND (Red) on P18.

4. **Test Exposure**

Press the i button in the lower left corner.

Press **Service Settings**.

Press **Test Exposure**.

Set the kv and mA that is being tested for.

Press the exposure button and hold till the multi-meter gives the reading.

5. **Conversion Factors**

5.1 **kV**

\[ \text{Volts} \times 17.467 = \text{kV} +/\text{5}\% \]

5.2 **mA**

\[ \text{Volts} \times 2.61 = \text{mA} +/\text{10}\% \]
# Chapter A: Service Mode

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Chapter A

Service Mode

1. PM 2002 CC (Non-Proline)

1.1 Entering Service Mode

Press CTI.let go and then hold the Hidden key for 6 seconds. (Figure 1)

Figure 1

1.2 Exiting Service Mode

Press the Hidden key to exit Service mode. (Figure 2)

Figure 2
2. Proline CC

2.1 Entering Service Mode

Hold CTL and CEPH key for 6 seconds simultaneously. (Figure 3)

Figure 3

2.2Exiting Service Mode

Press the CEPH key to exit Service mode. (Figure 4)

Figure 4
3. PM 2002 EC (Non-Proline)

3.1 Entering Service Mode

Press CTL let go and then press the Hidden key for 6 seconds. (Figure 5)

3.2 Exiting Service Mode

Press the Hidden key to exit Service mode. (Figure 6)
4. Proline EC

4.1 Entering Service Mode

Hold CTL and Hidden key for 6 seconds simultaneously. (Figure 7)

![Figure 7](image)

4.2 Exiting Service Mode

Press the Hidden key to exit Service mode. (Figure 8)

![Figure 8](image)
1. Pan (P90)

Press and hold P key till the time display flashes. (Figure 9)

Use the Exposure time + key to cycle through the available programs. (See Figure 9)

Press the P key to select P90 to do a beam check in Pan mode. (See Figure 9)

2. Ceph (P91)

Press and hold the P key till the time display flashes. (See Figure 9)

Use the Exposure time + key to cycle through the available programs. (See Figure 9)

Press the P key to select P91 to do a beam check in Ceph mode. (See Figure 9)
Collimator Mode

1. EC

Enter Service Mode. (See Chapter A)

Press CTL once let go, and then press the Clock key once then let go. (Figure x)

![EC Proline control panel]

Figure x

NOTE: The time display will change to SL00, SL01, SL0C, SL0D for digital and SL00, SL01, SL04, SL05, SL06 for film.

Press the Clock key to cycle to the next collimator.

1.1 Beam left/right

Press the mm + to move the beam left and mm - to move the beam right.

NOTE: To save any changes, press the Clock key to cycle back around to the collimator adjusting.

Press the CTL once and press the Clock key once to exit Collimator mode.
2. **CC**

   Enter Service Mode. (See Chapter A)

   Press CTL once let go, and then press the **Collimator Selection** key let go. (Figure x)

   ![Figure x](image)

   **NOTE:** The display will start to flash 0, 1, C, D for digital and 0, 1, 4, 5, 6 for film.

   Press the **Collimator selection** key to cycle to the next collimator.

   **2.1 Beam left/right**

   Press the mm + to move the beam left and mm – to move the beam right.

   **NOTE:** To save any changes, press the **Collimator Selection** key to cycle back around to the collimator adjusting.

   Press the **CTL** once and press the **Collimator Selection** key once to exit Collimator mode.
Fixed Sensor Holder Manual
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1. DISCLAIMER

This manual contains the information required to connect and remove fixed sensor holders on the Planmeca Proline XC Panoramic X-ray unit for Digital.

**WARNING**

Protect yourself from radiation when you are checking the beam alignment and calibrating. Since radiation safety requirements vary from state to state, country to country, it is the responsibility of the installer to ensure that the correct precautions are observed.

The display values shown in this guide are only examples and should be interpreted as recommended values unless otherwise specified.

2. REQUIRED TOOLS

2.1 Hand Tools

- 2.5 mm allen wrench
- 3 mm allen wrench
- 4 mm allen wrench
  - Short
  - Long
- Torx 30
Pan Connectors

1 Pan Only

1.1 Removing Covers

Use a 4mm allen to unscrew the hex screw on the bottom of the sensor holder. (Figure 1)

Slide the cover off by twisting the cover clockwise to get past the frankfort light. (Figure 2)
Use a 4mm allen to unscrew the two screws on the inside that holds the side cover on. (Figure 3)

![Figure 3](image)

Pull the side cover to the side to remove the cover.

1.2 Attaching/Removing Sensor

Loosen the two 3mm set screws on the bottom of the sensor holder. (Figure 4)

NOTE: The set screws are across from each other diagonally.

![Figure 4](image)
Push the post on the inside of the sensor holder away from the tube head. (Figure 5)

![Figure 5](image)

Take the metal disk off. (Figure 6)

![Figure 6](image)

Remove/Attach the sensor.

**NOTE:** When attaching the sensor make sure to push the post back into place to make contact with the sensor and re-tighten the set screws.

1.3 Adjusting Sensor Angle

Loosen the two 3mm set screws on the outside of the sensor holder. (Figure 7)

**NOTE:** Angled orientations are when you are facing the tube head.

![Figure 7](image)
1.3.a Angled Left
Loosen the bottom 2.5mm allen screw and tighten the top screw to fix the angulations. (Figure 8)

![Figure 8](image1)

1.3.b Angled Right
Loosen the top 2.5mm allen screw and tighten the bottom screw to fix the angulations. (See Figure 8)

2 Movable Pan

2.1 Removing Covers
Use a 3mm allen to unscrew the hex screw on the bottom of the sensor holder. (Figure 9)

![Figure 9](image2)
Slide the cover off by twisting the cover clockwise to get past the frankfort light. (Figure 10)

![Figure 10](image1.png)

Use a 2.5mm allen and loosen the two set screws on the blocks inside the sensor holder. (Figure 11)

![Figure 11](image2.png)

Pull the side cover to the side to remove the cover.

### 2.2 Attaching/Removing Sensor

Loosen the two 3mm set screws on the bottom of the sensor holder. (Figure 12)

![Figure 12](image3.png)
Push the post on the inside of the sensor holder away from the tube head. (Figure 13)

![Figure 13](image)

Take the metal disk off. (Figure 14)

![Figure 14](image)

Remove/Attach the sensor.

**NOTE:** When attaching the sensor make sure to push the post back into place to make contact with the sensor and re-tighten the set screws.

**2.3 Adjusting Angle**

Loosen the two 3mm set screws on the outside of the sensor holder. (Figure 15)

**NOTE:** Angled orientations are when you are facing the tube head.

![Figure 15](image)
2.3.a Angled Left

Loosen the bottom 2.5mm allen screw and tighten the top screw to fix the angulations. (Figure 16)

![Figure 16](image)

2.3.b Angled Right

Loosen the top 2.5mm allen screw and tighten the bottom screw to fix the angulations. (See Figure 16)
Chapter C

Ceph Connector

1 Ceph Connector

1.1 Removing Covers

Use a 4mm allen to unscrew the hex screw on the bottom of the sensor holder. (Figure 17)

Figure 17

Use the 4mm allen to unscrew the screw on the bottom again that holds the side cover on. (Figure 18)

Figure 18

Unscrew the 3mm allen on the top of the sensor holder to slide off the top cover. (Figure 19)

Figure 19
1.2 Attaching/Removing Sensor

Loosen the two 3mm set screws on the top of the sensor holder. (Figure 20)

Take the metal disk off. (See Figure 21)

Remove/Attach the sensor.

1.3 Adjusting Angle

1.3.a Angled Left

Loosen the bottom 2.5mm allen screw and tighten the top screw to fix the angulations. (Figure 22)

1.3.b Angled Right

Loosen the top 2.5mm allen screw and tighten the bottom screw to fix the angulations. (See Figure 22)
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1. REQUIRED TOOLS

1.1 Calibration Tools

50971               50977            50972

1.2 Hand Tools

- 2 mm allen wrench
- 2.5 mm allen wrench
- 3 mm allen wrench
- 4 mm allen wrench
  - Short
  - Long
- Pliers
- Wrench
Chapter B

Beam Alignment

Removing the covers

Unscrew the Tube head cover with a 3mm allen (Figure 1) and remove the front cover.

Unhook the two corners of the C-Arm cover and remove the cover. (Figure 2a & 2b)

NOTE: Make sure beam alignment tool is attached to the sensor alignment tool. (Figure 3)
1 Test Exposure

Press the i icon on the lower left-hand corner.

Press the down arrow twice and press Service Settings.

The password is 1701. After typing in the password, press Test Exposure.

Now press the exposure button to see where the radiation beam is hitting the screen.

The beam image should appear within the borders of the rectangle markings on the fluorescent screen. (Figure 4)

If not too left, right, up, down, or angled see below.

1.1 High / Low

If the beam is too high or too low, loosen up the two screws at the top and bottom positions on the collimator with a 3mm allen. (Figure 5)

Take another exposure until the beam is aligned.
1.2 **Left / Right**

If the beam is too left or too right, loosen up the two screws at the right and left positions on the collimator with a 2.5 mm allen (Figure 6)

![Figure 6](image)

Take another exposure until the beam is aligned.

1.3 **Angled**

If the beam is angled or not vertical, loosen up the four screws on the collimator pointing up, down, left or right with a 3 mm allen. (Figure 7a & 7b)

![Figure 7a](image) ![Figure 7b](image)

Tighten up the left and right screws then take another exposure to check alignment. If aligned then re-tighten the other two screws. If not, loosen the two screws and move again.

Move onto Beam Check.
NOTE: Make sure that the x-ray machine is connected to the computer.

1 Setting up Beam Check

Press the icon on the lower hand corner of the touch screen.

Press Beam Check.

NOTE: If the sensor was calibrated first, remember to remove the red calibration block from the collimator.

Press Panoramic which will bring you to the Beam Check Panoramic screen.

1.1 Beam Check on the computer

NOTE: Make sure the sensor is in the sensor holder.

Click on Start, All Programs, Planmeca, Beam Check then click Proline Pan

Press Ready on the touch screen then press the exposure button.

Image should be the same top and bottom, left and right. (Figure 8)

Follow Section 1.1-3 on pgs. 71 if the beam is not aligned properly.
Press the Beam Check Panoramic button on the top of the touch screen and select Pan.

1 Setting up the computer

Close Beam Check and open Dimax3 Tool

1.1 Dimax3 Tool

Click on Start, All Programs, Planmeca then Dimax3 Tool

Click on Settings and select Type and click on Proline. (Figure 9)

Click on Calibrate and select Pan. (Figure 10)

Follow the instructions on the computer screen.
1.2 Turning Radiation Off/On

1.2.a OFF

Press the smile in the middle right of the touch screen. (Figure 11)

Press all the arrows at the bottom of the touch screen, turning each from white to red. (Figure 12)

1.2.b ON

Press the smile in the middle right of the right of the touch screen. (See Figure 12) Then Press all the arrows at the bottom of the touch screen, turning each from red to white.

NOTE: Make sure the red calibration block is placed onto the collimator before calibrating. (Figure 13)
1.3 kV/mA settings for Panoramic

NOTE: These settings are for Dimax3 v2 sensors

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<tr>
<th>BINNING</th>
<th>kV</th>
<th>mA</th>
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<td>66</td>
<td>4</td>
</tr>
<tr>
<td>2x2</td>
<td>70</td>
<td>6</td>
</tr>
</tbody>
</table>

1.4 Changing Binnings

Click Settings and select Binnings then the appropriate binning. (Figure 14)

Figure 14

Press the Ready icon after turning the radiation off or on. Take an exposure.

NOTE: Make sure when checking all binnings the correct kV/mA are being used.

Image will come out as showing a grey box with a black stripe in the center. (Figure 15)

Figure 15

NOTE: There is no need to close and re-open Dimax3 Tool to check all binnings. Follow 1.4 for calibrating other binnings.
Chapter E

Ball Phantom

1 Setting up Touch Screen

Place the ball phantom in the patient positioning mechanism.

Alignment lasers

Hold the layer right button for 1 second.

Adjust the layer so that it is at zero with the layer arrow fields. (Figure 16)

Look at where the lasers are lining up on the ball phantom. This is the starting reference point. (Figure 17)
Setting the kV/mA

Press the kV/mA at the top left of the screen on the touch screen. (Figure 18)

Select the 60kV / 4mA then click OK.

Romexis

Click on Start, All Programs, Planmeca, Romexis.

Click on Find and then double click the Test patient. (Figure 19)

Click on Imaging on the left. (Figure 20)

Click on Pan at the top. (Figure 21)

Press Ready on the touch screen and take an exposure.

Click Done on the computer screen to evaluate the image for alignment. (Figure 22)
2.1 Calibrating and measuring image

Click on the CAL icon, and calibrate the Center Ball from top to bottom. (Figure 23)

NOTE: To create a line, left click to start the line and right click to complete the measurement.

Enter the number 7 when asked to input a distance. (Figure 24)

3 Checking image

There will be an image of 23 balls on the screen; one Center Ball and 11 balls to the left and right.

NOTE: Make sure Center Ball is round before moving onto the 10th ball distances.

3.1 Center Ball

NOTE: Center ball will be above the midsagittal bar of the ball phantom. (Figure 25)
Click the icon below CAL and measure the top to bottom and left to right. (Figure 26)

The ball should be 7mm top to bottom and left to right. (Figure 27)

3.1.a Too thin

If the ball is too thin then move the layer to the right. (Figure 28)

Take another exposure and check ball size again. If the right size, check 10\textsuperscript{th} ball.

3.1.b Too Fat

If the ball is too fat then move the layer to the left. (Figure 29)

Take another exposure and check ball size again. If the right size, check 10\textsuperscript{th} ball.

If the center ball is round move onto 10\textsuperscript{th} ball.
3.2 10\textsuperscript{th} Ball

Measure from the left end of the Center Ball to the 10\textsuperscript{th} Ball on the right then measure from the right end of the Center Ball to the 10\textsuperscript{th} Ball. (Figure 30)

![Figure 30](image)

3.2.a Too Left

If the distance from the Center Ball to the left is more than the right, then move the table away from the column. (Figure 31).

![Figure 31](image)

3.2.b Too Right

If the distance from the Center Ball to the right is more than the left, then move the table toward the column. (Figure 32)

![Figure 32](image)
3.2.c Moving the Table

Unscrew the four screws on the table with a 4mm allen. (Figure 33)

Figure 33

Take another exposure and check Ball Phantom alignment.

3.3 Shadow Ball

NOTE: The oval above the Center Ball. (Figure 34)

Figure 34

3.3.a Too Left/ Too Right

If the shadow ball is too left or too right, loosen up the two screws at the right and left on the collimator with a 2.5 mm allen (Figure 35)

Figure 35

Take another exposure until the shadow ball is aligned.
Chapter F

Patient Positioning Lights

After aligning the Ball Phantom, turn the patient positioning lights on again by holding the layer right button for 1 second.

NOTE: Make sure layer is at zero when aligning positional lights. If layer is not at zero need to zero-out layer before aligning beams.

Press the icon in the lower left hand corner.

Press Service Settings.

Press Patient Positioning Adjustment.

The screen will say Please Wait then show the number 0. Press Back until at start up screen.

Place the Ball Phantom into the patient positioning mechanism with the Frankfort plane alignment tool on top of the Ball Phantom. (Figure 36)

1 Midsagittal Light Beam

If the midsagittal light is not lined up with the center line on the Ball phantom, then finger adjust the mirror until it lines up. (Figure 37)
2 Frankfort Light Beam

If the Frankfort light is not straight on the Frankfort plane tool, then adjust the barrel of the laser. (Figure 38)

![Figure 38](image)

3 Focal Layer Light Beam

If the focal layer light is not straight on the Ball Phantom, then finger adjust the mirror until it lines up. (Figure 39)

![Figure 39](image)
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Chapter A

General Information

1. REQUIRED TOOLS

1.1 Calibration Tools (P/N below image)

- 50971
- 50977
- 50972
- 10002699
- 665413
- 10002935
- 651003, 651005 (R and L)

1.2 Hand Tools

- 2 mm allen wrench
- 2.5 mm allen wrench
- 3 mm allen wrench
- 4 mm allen wrench
  - Short
  - Long
- Pliers
- Adjustable wrench
1 Beam Alignment

Removing the covers

Unscrew the Tube head cover with a 3mm allen (Figure 1) and remove the front cover.

Unhook the two corners of the C-Arm cover and remove the cover. (Figure 2a & 2b)

Primary Collimator

Press the i button in the lower left-hand corner.

Press the down arrow and press Service Settings.

**The password is** 1701. Press the down arrow four times and press Primary Collimator.
NOTE: Make sure beam alignment tool is attached to the sensor alignment tool. (Figure 3)

1.1 Collimator 0 (adult)

Now press the exposure button to see where the radiation beam is hitting the screen.

The beam image should appear within the borders of the rectangle markings on the alignment tool. (Figure 4)

If not too left, right, up, down, or angled see below.
1.1.a High / Low

If the beam is too high or too low then loosen the two screws on the face of the collimator with a 2.5 mm allen. (Figure 5)

![Figure 5](image)

Tighten the bottom screw and take another exposure to check the alignment. If aligned then re-tighten the top screw. If not aligned then loosen bottom screw again, adjust, retighten then take another exposure.

1.1.b Left / Right

If the beam is too left or right, press the left or right button on the touch screen. (Figure 6)

![Figure 6](image)

NOTE: Pressing the left button will move the beam to the right and right will move the beam to the left.

Take another exposure and check the alignment. If aligned, push Next until you come back to 0.
1.1.c Angled

If the beam is angled, loosen up the three screws at left, top, and bottom with a 1.5 mm allen. (Figure 7a-c)

Tighten the screws and take another exposure at the beam. Repeat if still angled. If aligned, move onto Collimator 1 by pressing Next.
1.2 Collimator 1 (child)

Now press the exposure button to see where the radiation beam is hitting screen. The beam image should appear within the borders of the rectangle markings on the fluorescent screen. The beam should fill, from the bottom up, three quarters of the alignment tool. (Figure 8)

NOTE: The beam in Collimator 1 will not have to be adjusted up or down, if Collimator 0 is aligned first.

1.2.a Left / Right

If the beam is too left or right, press the left or right button on the touch screen. Take another exposure and check the alignment. If aligned, push Next until you come back to 1. Click OK and move onto checking your Ball Phantom.

NOTE: If unable to move collimator over enough, loosen the securing screw (Figure 9), rotate the tab slightly and retighten the screw. The collimator should be rechecked, if unaligned then start over at Collimator 0.

Move onto Beam Check if beam is aligned.
2 Beam Check

2.1 Setting up Beam Check

Press the i icon on the lower hand corner of the touch screen.

Press Beam Check.

NOTE: If the sensor was calibrated first, remember to remove the red calibration block from the collimator.

Press Panoramic which will bring you to the Beam Check Panoramic screen.

2.2 Beam Check on the computer

NOTE: Make sure the sensor is in the sensor holder.

Click on Start, All Programs, Planmeca, Beam Check then click Proline Pan.

Press Ready on the touch screen then press the exposure button.

Image should be the same top and bottom, left and right. (Figure 10)

Figure 10

Follow Section 1.1.a-c on pgs. 90-92 if not aligned properly.
3 Calibrating

Press the Beam Check Panoramic button on the top of the touch screen and select Pan.

3.1 Setting up the computer

Close Beam Check and open Dimax3 Tool

3.1.a Dimax3 Tool

Click on Start, All Programs, Planmeca then Dimax3 Tool.

Click on Settings and select Type and click on Proline. (Figure 11)

Click on Calibrate and select Pan. (Figure 12)

Follow the instructions on the computer screen.

3.1.b Turning Radiation Off/On

3.1.b.i OFF

Press the smile in the middle right of the touch screen. (Figure 13)
Press all the arrows at the bottom of the touch screen, turning each from white to red. (Figure 14)

![Figure 14](image)

**3.1.b.ii ON**

Press the smile in the middle right of the right of the touch screen. (See Figure 14) Then Press all the arrows at the bottom of the touch screen, turning each from red to white.

*NOTE:* Make sure the red calibration block is placed onto the collimator before calibrating. (Figure 15)

![Figure 15](image)

**3.1.c kV/mA settings for Panoramic**

*NOTE:* These settings are for a Dimax3 v2 sensor

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<tr>
<th>BINNING</th>
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<th>mA</th>
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<td>3x3</td>
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<td>4</td>
</tr>
<tr>
<td>2x2</td>
<td>70</td>
<td>6</td>
</tr>
</tbody>
</table>

**3.1.d Changing Binnings**

Click **Settings** and select **Binning** then the appropriate binning. (Figure 16)

![Figure 16](image)
Press the \texttt{Ready} icon after turning the radiation off or on. Take an exposure.

\textbf{NOTE:} Make sure when checking all binnings the correct kV/mA are being used.

Image will come out as showing a grey box with a black stripe in the center. (Figure 17)

![Figure 17](image)

\textbf{NOTE:} There is no need to close and re-open Dimax3 Tool to check all binnings. Follow 3.1.d on pg. 63 for checking the other binnings.

4 \hspace{1em} \textbf{Ball Phantom}

4.1 \hspace{1em} \textbf{Setting up Touch Screen}

Place the ball phantom in the Patient Positioning Mechanism.

\textbf{Alignment lasers}

Hold the layer right button for 1 second.

Adjust the layer so that it is at zero with the layer arrow fields. (Figure 18)

![Figure 18](image)

Look at where the lasers are lining up on the ball phantom. This is the starting reference point. (Figure 19)

![Figure 19](image)
Setting the kV/mA
Press the kV/mA at the top left of the screen on the touch screen. (Figure 20)

Select the 60kV / 4mA then click **OK**.

**4.2 Romexis**

Click on **Start**, **All Programs**, **Planmeca**, **Romexis**.

Click on **Find** and then double click the **Test** patient. (Figure 21)

Click on Imaging on the left. (Figure 22)

Click on Pan at the top. (Figure 23)

Press **Ready** on the touch screen and take an exposure.

Click **Done** on the computer screen to evaluate the image for alignment. (Figure 24)

**4.2.a Calibrating and measuring image**

Click on the **CAL** icon, and calibrate the Center Ball from top to bottom. (Figure 25)

**NOTE:** To create a line, left click to start the line and right click to complete the measurement.
Enter the number 7 when asked to input a distance. (Figure 26)

4.3 Checking image

There will be an image of 23 balls on the films; one Center Ball and 11 balls to the left and right.

NOTE: Make sure Center Ball is round before moving onto the 10th ball distances.

4.3.a Center Ball

NOTE: Center ball will be above the midsagittal bar of the ball phantom. (Figure 27)

Click the icon below CAL and measure the top to bottom and left to right. (Figure 28)

The ball should be 7mm top to bottom and left to right. (Figure 29)
4.3.a.i Too thin

If the ball is too thin then move the layer to the right. (Figure 30)

![Figure 30](image1)

Take another exposure and check ball size again. If the right size, check 10th ball.

4.3.a.ii Too Fat

If the ball is too fat then move the layer to the left. (Figure 31)

![Figure 31](image2)

Take another exposure and check ball size again. If the right size, check 10th ball.

4.3.b 10th Ball

Measure from the left end of the Center Ball to the 10th Ball on the right then measure from the right end of the Center Ball to the 10th Ball. (Figure 32)

![Figure 32](image3)
4.3.b.i  Too Left

If the distance from the Center Ball to the left is more than the right, then move the table away from the column. (Figure 33).

![Figure 33](image)

4.3.b.ii  Too Right

If the distance from the Center Ball to the right is more than the left, then move the table toward the column. (Figure 34)

![Figure 34](image)

4.3.b.iii  Moving the Table

Unscrew the four screws on the table with a 4mm allen. (Figure 35)

![Figure 35](image)

Take another exposure and check Ball Phantom alignment.
4.3.c Shadow Ball

NOTE: The oval above the Center Ball. (Figure 36)

4.3.c.i Too Left/ Too Right

If the shadow ball is too left or right, press the left or right button on the touch screen. (Figure 37)

NOTE: Pressing the left button will move the beam to the right and right will move the beam to the left.

Take another exposure and check the alignment. If aligned, push Next until you come back to 0.

4.4 Patient Positioning Lights Alignment

After aligning the Ball Phantom, turn the Patient Positioning Lights on again by holding the layer right button for 1 second.

NOTE: Make sure layer is at zero when aligning positional lights. If layer is not at zero need to zero-out layer before aligning beams.

Press the icon in the lower left hand corner.

Press Service Settings

Press Patient positioning adjustment.
The screen will say Please Wait then show the number 0. Press Back until at start up screen.

Place the Ball Phantom into the Patient positioning mechanism with the Frankfort plane alignment tool on top of the Ball Phantom. (Figure 38)

![Figure 38](image)

**4.4.a Midsagittal Light Beam**

If the midsagittal light is not lined up with the center line on the Ball phantom, then finger adjust the mirror until it lines up. (Figure 39)

![Figure 39](image)

**4.4.b Frankfort Light Beam**

If the Frankfort light is not straight on the Frankfort plane tool, then adjust the barrel of the laser. (Figure 40)

![Figure 40](image)
4.4.c Focal Layer Light Beam

If the focal layer light is not straight on the Ball Phantom, then finger adjust the mirror until it lines up. (Figure 41)

![Figure 41](image-url)
Chapter C

Cephalometric

Entering Cephalometric Mode
Press Pan on the touch screen and select Ceph.

1 Beam Alignment

Primary Collimator
Press the I button in the lower left-hand corner.
Press the down arrow and press Service Settings.
Press the down arrow four times and press Primary Collimator
Press Next until C appears on the touch screen. (Figure 42)

NOTE: Collimator C is a manually adjusted alignment with 4mm and 6mm allens.

Attach the sensor alignment tool to the sensor holder with the fluorescent screen attached to it. One Up to Down and the other Up to the right and Down to the left. (Figure 43)
1.1 Collimator C

There are two screws on the back left hand side of the Cephalometric arm. (Figure 44)

![Figure 44](image)

The beam should look like:

1.1.a Too Left

If the beam is too left then unscrew right of screw with a 6mm and tighten the left screw with a 4mm. (See Figure 44)

Take another exposure. If aligned then move onto Collimator d.

1.1.b Too Right

If the beam is too right then unscrew the left screw with a 4mm and tighten the right screw with a 6mm. (See Figure 44)

Take another exposure. If aligned then move onto Collimator d.

1.1.c High / Low

Loosen the two screws on the right collimator with a 2.5mm allen. (Figure 45)

![Figure 45](image)
Use your fingers to adjust the collimator up or down, depending on what is needed. Tighten the bottom screw and take another exposure. If aligned then tighten up the top screw

Click Next to move onto Collimator D

### 1.2 **Collimator D**

Press the exposure switch to see where beam is hitting. Beam should be:

![Collimator Diagram]

#### 1.2.a Left

If the beam is too left, then press the right button on the touch screen. (Figure 46)

![Touch Screen Screenshot]

Take another exposure and check the beam. If aligned, press next until you get back to d and re-check to make sure unit held adjustments.

#### 1.2.b Right

If the beam is too right, then press the left button on the touch screen. (See Figure 46)

Take another exposure and check the beam. If aligned, press **Next** until you get back to d and re-check to make sure unit held adjustments.
2  **Ceph Head Leveling**

Put the left and right ear posts into their respective holders. (Figure 47)

![Figure 47](image)

### 2.1 Computer Setup

Click on **Start** then **Run**.

Type in *pmsample* then click **OK**.

Uncheck **Use calibration**. (Figure 48)

![Figure 48](image)

Click on **CEPHALO**. (Figure 49)

Set the kV / mA to 60 kV and 4 mA

Press **Ready** on the touch screen.

![Figure 49](image)
Ball should be within ring. (Figure 50)

If the ball is outside the ring then remove the cover with a 2.5mm allen. (Figure 51)

NOTE: Will need a wrench and pliers to adjust left or right. (Figure 52)
2.2 Left / Right

2.2.a Left

To move the ball left, tighten the rod towards the column. (Figure 53)

After adjusting, do a new beam check and calibration.

Figure 53

2.2.b Right

To move the ball right, loosen the rod away from the column. (See Figure 49) After adjusting, do a new beam check and calibration.

2.3 Up / Down

2.3.a Up

To raise the ball up, loosen up the two screws on the left and tighten the screw at the triangle end. (See Figure 54) After adjusting, do a new beam check and calibration.

2.3.b Down

To lower the ball, loosen the screw at the triangle end and tighten the two screws on the left square side. (See Figure 54) After adjusting, do a new beam check and calibration.
3 Beaver Tail (Secondary Collimator)

Attach the beaver tall to the unit by first removing the cover by unscrewing the 4mm screw with an allen. (Figure 54)

Unscrew the two screws attached to the top of the beaver tall with a 4mm allen and attach that to the closest side to the tube head, or across from the sensor holder. (Figure 55 & 56)

Move the fluorescent screen so that it is going from left and right to up and down, respectively.
NOTE: The touch screen should still be in **Primary Collimator** showing the d collimator and the sensor alignment tool should still be on the sensor holder.

Press the exposure switch to see where the beaver tall is collimating the beam. It should fill both the top and bottom within the box on both fluorescent screens. (Figure 57)

![Figure 57](image)

3.1 **Left / Right**

If the beam is too left or right, loosen the two screws closest to the tubehead with a 4mm and slide left or right depending on what is needed. (Figure 58)

![Figure 58](image)

Take another exposure and check alignment, if still off adjust again. If aligned then re-tighten the screws and take a final exposure to make sure nothing has shifted.
3.2 High / Low

If the beam is too high or low, loosen the three screws on the back of the beaver tall that are at the top closest the sensor holder. (Figure 59)

NOTE: If unable to move beaver tall up or down after loosen these screws, take a 2.5mm allen and loosen slightly the two screws on the beaver tall that are towards the front of the machine. (Figure 60)

Re-tighten the middle screw to hold the adjusted position and take another exposure, if still off adjust again. If aligned then re-tighten the other two screws and the two side screws, if they were un-tightened. Take another to check that nothing has shifted.

3.3 Angled

If the beam is angled, loosen the two side screws that are facing the sensor holder with a 4mm allen. (See Figure 60)

3.3.a Left

Un-tighten the bottom side screw with a 2.5mm allen and tighten the top screw in. (Figure 61)

Take an exposure, adjust as needed.
3.3.b Right

Un-tighten the top side screw with a 2.5mm allen and tighten the bottom screw in. (See Figure 61)

Take an exposure, adjust as needed.

4 Beam Check

NOTE: Remember to put the sensor into the sensor holder before continuing.

NOTE: Make sure that the x-ray machine is connected to computer

4.1 Setting up beam check

Press the icon on the lower hand corner of the touch screen.

Press Beam Check.

NOTE: If the sensor was calibrated first, remove the red calibration block from the collimator.

Press Cephalometric which will bring you to the Beam Check Cephalometric screen.

Select Proline Ceph on the computer in Beam Check.

Image should be the same top and bottom, left and right. (Figure 62)

Follow Section 1.1.a-c on pgs.90-92 if the beam is not aligned properly
5 Calibrating

Press Beam Check Cephalometric then choose Ceph.

Press Collimator until it shows the number 6. (Figure 63)

![Collimator 6](image)

Figure 63

5.1 kV / mA

NOTE: These settings are for a Dimax3 v2 sensor.

<table>
<thead>
<tr>
<th>Binnings</th>
<th>kV</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x4</td>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>3x3</td>
<td>60</td>
<td>6</td>
</tr>
</tbody>
</table>

Place the Cephalostat calibrating tool (hatchet) into the patient’s right ear post holder with the point going towards the back or column. (Figure 64)

![Figure 64](image)

NOTE: Change binnings by clicking Settings and select Binnings then the appropriate binning in Dimax3 tool. (Figure 65)

![Figure 65](image)
5.2 Computer

Click on **Start**, **All Programs**, **Planmeca**, **Dimax3 Tool**.

5.3 Dimax3 Tool

Click on **Settings** then click on **Type** then select **Proline**. (Figure 66)

Click on **Calibrate** then select **Ceph** (Figure 67)

Click **Ready** on the touch screen and take an exposure

*NOTE*: image will come out as being a grey hatchet with black around it. (Figure 68)
Press the L key on the keyboard of the computer to give calibration lines. This

gives the point where the images are combined in the computer.

Click the magnify glass (+) to zoom in on the lines to check combination.

NOTE: There is a + / - 2 clicks left or right on the keyboard to get aligned left to right.

5.3.a Not together

If the image comes out separated check to make sure that the hatchet is placed in the holder correctly.

5.3.a.i Raising up

If hatchet is placed correctly, then raise the beaver tail up.

If the beam is too high or low, loosen the three screws on the back of the beaver tail that are at the top closest the sensor holder. (Figure 69)
ProMax Exposure Wiring Instructions

I. Phone Jack

Wall Exposure:

Hand Held Exposure:

- Wiring guide:
  - Blue → White
  - Black → Yellow
  - Yellow → Black
  - White → Blue

Red and green not connected
II. RJ12 (Punch Down)

Wall Exposure:

NOTE: The wires are going to cross between the two jacks.

RJ12 Wiring Configuration

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
<th>Unit Jack</th>
<th>Remote Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
<th>Unit Jack</th>
<th>Remote Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Orange</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

TERMINAL = ON

VCC

EXPOUT

TERMINAL = ON

VCC

EXPIND

EXPIND
III. RJ45 (Punch Down)

Wall Exposure:

**Wiring Configuration 568A**

- Pin 1: Not used
- Pin 2: Green = RDYIND
- Pin 3: Orange White = EXPIND
- Pin 4: Not used
- Pin 5: Not used
- Pin 6: Orange = VCC
- Pin 7: Brown White = EXPOUT
- Pin 8: Not used

**Wiring Configuration 568B**

- Pin 1: Not used
- Pin 2: Orange = RDYIND
- Pin 3: Green White = EXPIND
- Pin 4: Not used
- Pin 5: Not used
- Pin 6: Green = VCC
- Pin 7: Brown White = EXPOUT
- Pin 8: Not used

**TERMINAL = ON**

- RDYIND
- EXPIND
- EXPOUT
- VCC

**NOTE:** 568B Configuration is shown.
ProMax Installation Instructions and Dimensions

Wall preparation:
- The pan or pan/ceph creates a pull-out force of 1216 pounds.
- Wall bracket has 4 pre-drilled holes, 16” and 12” on center. Either one can be used.
- If metal studs are in wall, use a mounting board to expand the load over several studs to meet the pull-out requirement. If needed, sandwich the wall on both sides.

Mounting Options:
- Top wall mount (49.5 inches) and to the floor
- Two wall mounts (49.5 inches and 8-16 inches)*

*optional mounting configuration and the second mount must be ordered additionally. Part Number 10001073.

Input / Output Outlets
All outlets must be within 3 feet from the back of the column and 12-48” from the floor.
- Power: 110V, 20A dedicated circuit
- Remote exposure switch: 2”x4” electrical boxes at ProMax and remote exposure switch locations.
  - ½” conduit between 2”x4” electrical boxes required
  - All parts supplied for exposure switch connection
- Digital computer connection: Ethernet RJ45 port to computer

Pan Dimensions:

Recommended operating dimensions
(actual product dimensions in parenthesis)

<table>
<thead>
<tr>
<th></th>
<th>Film</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>64” (48”)</td>
<td>61” (42 ½”)</td>
</tr>
<tr>
<td>Width</td>
<td>22” (9”)</td>
<td>22” (9”)</td>
</tr>
<tr>
<td>Width</td>
<td>42” (39”)</td>
<td>39” (33 ½”)</td>
</tr>
<tr>
<td>Width</td>
<td>27 ½”</td>
<td>27 ½”</td>
</tr>
</tbody>
</table>

Top limits can be set at the install site.
**Film Ceph Dimensions:**

Top limits can be set at the installer.

**Digital Ceph Dimensions:**

Top limits can be set at the installer.

**Recommended operating dimensions**

(actual product dimensions in parenthesis)

- Film Ceph:
  - 64" (49 1/2")
  - Width: 27 1/2"
  - Height: 39"

- Digital Ceph:
  - 46" (44 1/2")
  - Width: 39" (33 1/2")
  - Height: 60 1/2" - 95 1/2"

- Film Ceph Dimensions:
  - 51 1/2" - 86 5/8"
  - 38" - 73 3/4" chest
  - 38 1/4" - 74"
  - 48" - 50"
  - 32 1/2" - 67 3/4" seat support

- Digital Ceph Dimensions:
  - 51 1/2" - 86 5/8"
  - 38" - 73 3/4" chest
  - 38 1/4" - 74"
  - 48" - 50"
Position Sensor Calibration (POTS)

Part 1:

Press \textit{i} then select \textbf{Technical Calibration} (60.0) then select \textbf{Position Sensor Calibration}. (64.0).

Press \textbf{Position Sensor} (64.1)

Press \textbf{Check}, \textbf{Lock} and then \textbf{Release}.

Put the locking pins into the elbow/c-arm and in the shoulder (Figure 1a-c)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1}
\caption{Figure 1a}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2}
\caption{Figure 1b}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3}
\caption{Figure 1c}
\end{figure}

Press \textbf{Lock}

If all the triangles are green, then remove pins and press \textbf{Done}

If any of the pots are red or not centered, align the according pot before removing the pins.

Part 2: \hspace{1cm} \textbf{Aligning Pots}

A. \hspace{1cm} \textbf{Shoulder}

Unscrew the set screw with a 1.5mm allen to get the sensor coupling off of the spindle. (Figure 2)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4}
\caption{Figure 2}
\end{figure}
Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 3)

![Figure 3](image)

Put sensor coupling back onto spindle and re-tighten set screw. Re-check still in the green and center.

When aligned take out the pins then press Done.

B. **Elbow**

Unscrew the set screw with a 2mm allen to get the sensor holder off of the cable guide. (Figure 4)

![Figure 4](image)

Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 5)

![Figure 5](image)

When aligned take out the pins then press Done.
C. C-Arm

Unscrew the set screw with a 2mm allen to get the sensor coupling off of the spindle. (Figure 6)

Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 7)

When aligned take out the pins then press Done.
Replacing/Upgrading Software for ProMax

NOTE: Check the markings above the sockets, never put the chip intended for one socket into another socket.

Part 1: Replacing the CPU PCB software chips

1. Turn the unit off and unplug the unit from the wall.
2. Remove the column cover panels.
3. Remove the PCI or Ethernet PCB from the CPU PCB. (If digital)
4. Remove the software chips from their sockets with a chip puller.

   NOTE: The orientation of the software chip is critical. NEVER try to force the chip into the socket.

5. Carefully place the new software chips into their respective sockets
6. Put the removed PCB and column cover panels back on.

Part 2: Loading the software the computer for a CPU PCB

1. Remove the rear cover on the GUI by unscrewing the T8 torque screw.
2. Connect the Software loading cable (p/n 10003926) to the PS/2 connector at the underside of the GUI.
3. Connect the other end of the Software loading cable to the computer serial port COM1 or COM2.
4. To start the software update, double click the ProMax software loading program icon:
   - CPU PCB: ProMax 1.1X.X
5. The serial port is asked for and input the number 1. Press “Enter” and the update will start.
6. The software update window will close when it is finished updating the software.

Part 3: Updating GUI software from the CPU PCB Software

1. Press i on the GUI
2. Press Service Settings (50.0)
3. Password is 1701.

   NOTE: Software Update is an available function in 1.18.x or higher.

4. Press Software Update (59.0)
5. Press Update
6. Press Done once the update is finished.
Replacing Power Supply PCB

**WARNING:**
Make sure that the unit is turned off and unplugged from the outlet before replacing Power Supply PCB.

**Part 1: Removing Old Power PCB**

1. Remove the column panel covers.

   **NOTE:** Frankfort plane positioning light must be removed to be able to replace Power Supply PCB.

2. Unscrew the four 2.5mm allen attachment screws of the Frankfort plane positioning light assembly.

3. Disconnect the light cable from the CPU PCB terminal J7 and remove the light assembly.

4. Unplug all cables from the CPU PCB and the Power Supply PCB.

   **NOTE:** All plugs are labeled.

5. Unscrew all of the 2.5mm allen attachment screws.

6. Remove the CPU PCB and the Power Supply Board.

**Part 2: Replacing a Power PCB version F or older**

1. Unscrew the four 2.5mm allen attachment screws holding the PFC-Choke assembly and remove the PFC-Choke assembly.

2. Move the lower right PCB holder bushing to the upper left hole of the removed PFC-Choke assembly.

3. Attach the bushing supplied with the new board o the upper right hold of the removed PFC-Choke assembly.

**Part 3: Installing the new Power Supply PCB**

1. Put the new Power Supply PCB into column and screw in the attachment screws but keep them loose.

2. Put the CPU PCB back in and screw in the attachment screws but keep them loose.

3. Plug all the connections back in.

4. Tighten down 1a, followed by 1b, then tighten down the rest of the attachment screws.

5. Put the Frankfort position light assembly back in.

6. Put the Ethernet or PCI PCB back in. (If Digital)

7. Replace the covers and turn the unit back on.
Replacing CPU PCB

**WARNING:**
Make sure that the unit is turned off and unplugged from the outlet before replacing CPU PCB

Part 1: Removing Old CPU PCB

1. Remove the column panel covers.
2. Unplug the connections and remove the PCI or Ethernet PCB by unscrewing the four 2.5mm allen attachment screws.
3. Unplug all of the connections on the CPU PCB.
4. Unscrew the four bushings holding the CPU PCB to the column.
5. Remove the CPU PCB.

Part 2: Installing the new CPU PCB.

1. Put the new CPU PCB into the column and screw the bushings back into but keeping them loose.

   **NOTE:** All connection plugs are labeled.

2. Plug the connections back into the CPU PCB.
3. Tighten down the attachment screws and put the PCI or Ethernet PCB back into the column.
4. Plug the connections back in and screw the attachment screws back in.
5. Replace the covers and turn the unit back on.
ProMax Invasive Testing

I. Filament Definition (Preheat Calibration)

1. Press the i in the lower left corner.
2. Press Service Settings, i500.
3. Press Preheat calibration, i520.
4. Press and hold the exposure button. Press Done when the exposure is finished.
5. Press Exit to get back to the home screen.

II. Connecting Invasive cables

1. Connect the invasive cable black connector into the tubehead feedback board. (Figure 6)

2. Connect a multi-meter into the black and red connectors of the invasive cable. (Figure 7)

NOTE: There are two red and two black connectors. One set is for kV testing and the other is for mA testing with each set marked as to which is kV and mA. (Figure 8)
III. Test Exposure Mode

1. Press the i in the lower left corner.
2. Press Special Functions, i400.
3. Press Test Exposure, i460.
4. Set kV and mA to what is needed to be tested.
5. Press Test to ready the machine.

NOTE: To be able to see the voltage, the time may be needed to be increased.

6. Press the exposure button and take the reading.

IV. Conversion Factors

1. kV

\[ \text{Volts} \times 27 = \text{kV} \pm 5\% \]

2. mA

\[ \text{Volts} \times 5.06 = \text{mA} \pm 10\% \]
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>H101</td>
<td>Exposure switch</td>
<td>Released before end of exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuedly depressed or cable short circuited</td>
</tr>
<tr>
<td>H102</td>
<td>Emergency stop pressed</td>
<td>Height movement and radiation stopped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>due to stop switch was activated</td>
</tr>
<tr>
<td>H115</td>
<td>AEC related</td>
<td>AEC is receiving too much radiation</td>
</tr>
<tr>
<td>H116</td>
<td></td>
<td>AEC is receiving too little radiation</td>
</tr>
<tr>
<td>H121</td>
<td>Cassette related</td>
<td>Is missing</td>
</tr>
<tr>
<td>H122</td>
<td></td>
<td>Not moved since last exposure</td>
</tr>
<tr>
<td>H125</td>
<td></td>
<td>AEC is receiving too much radiation</td>
</tr>
<tr>
<td>H126</td>
<td></td>
<td>AEC is receiving too little radiation</td>
</tr>
<tr>
<td>H127</td>
<td></td>
<td>AEC exposure is too long</td>
</tr>
<tr>
<td>H141</td>
<td>Height movement</td>
<td>Stopped due to the Stop switch activation</td>
</tr>
<tr>
<td>H142</td>
<td></td>
<td>Stopped due to interference with an external object</td>
</tr>
<tr>
<td>H143</td>
<td></td>
<td>Not possible because stop switch is activated</td>
</tr>
<tr>
<td>H151</td>
<td>Line voltage</td>
<td>Dropped too low during the exposure</td>
</tr>
<tr>
<td>H152</td>
<td></td>
<td>Is too low</td>
</tr>
<tr>
<td>H161</td>
<td>Temperature</td>
<td>Of tube head too high</td>
</tr>
<tr>
<td>H162</td>
<td></td>
<td>Of lift motor too high</td>
</tr>
<tr>
<td>H163</td>
<td></td>
<td>Of the power supply (PSU) heatsink too high</td>
</tr>
<tr>
<td>H165</td>
<td></td>
<td>Temperature too high for exposure parameters</td>
</tr>
<tr>
<td>H166</td>
<td></td>
<td>Maximum tube head energy exceeded</td>
</tr>
<tr>
<td>Error Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>H171</td>
<td>Dimax3 sensor head not installed properly to C-arm</td>
<td>The sensor has not been installed and/or locked in its position</td>
</tr>
<tr>
<td>H172</td>
<td>Dimax3 sensor head not installed properly to Cephalostat</td>
<td></td>
</tr>
<tr>
<td>H175</td>
<td>PC program selection in conflict with selected ProMax program</td>
<td>Wrong exposure mode has been selected on the PC</td>
</tr>
<tr>
<td>H176</td>
<td>Safety area limit violation</td>
<td>Change the values for layer thickness, position or the angle</td>
</tr>
<tr>
<td>H177</td>
<td>One or more image layers will not be exposed with these settings</td>
<td>Change position.</td>
</tr>
<tr>
<td>H178</td>
<td>Imaging impossible with selected settings.</td>
<td>Change the exposure settings</td>
</tr>
<tr>
<td>H179</td>
<td>The cassette number is missing</td>
<td>Enter the cassette number</td>
</tr>
<tr>
<td>H180</td>
<td>AEC not available</td>
<td>The AEC license is not activated or available</td>
</tr>
<tr>
<td>H181</td>
<td>Exposure interrupted by the workstation</td>
<td></td>
</tr>
<tr>
<td>H182</td>
<td>Timeout in image data transmission</td>
<td></td>
</tr>
<tr>
<td>H183</td>
<td>Attached sensor is not suitable for the selected program</td>
<td></td>
</tr>
<tr>
<td>H184</td>
<td>Move 3D sensor aside</td>
<td></td>
</tr>
<tr>
<td>H185</td>
<td>3D sensor not installed properly</td>
<td></td>
</tr>
<tr>
<td>H186</td>
<td>No IP-address defined for the 3D sensor</td>
<td></td>
</tr>
</tbody>
</table>

**Quick Reference Manual**
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
</table>
| E201       | MCM – module overheated | 1- shoulder motor  
2- elbow motor  
3- temple support/Dimax3 Ceph scan  
4- C-arm rotation motor  
5- receptor pan /X&Y collimation  
6- receptor rotation  
7- for receptor lift/ X&Y collimation  
8- for tube head lift function | Exposure interrupted |
<p>| E207       | 0- lift motor | Check C-Arm board |
| E211       | 1- shoulder motor PCB | Check the motor, interface and cable. |
| E212       | 2- elbow motor | |
| E213       | 3- temple rest motor | |
| E214       | 4- Dimax3 Ceph scan motor | |
| E215       | 5- C-arm rotation motor | |
| E216       | 6- receptor pan motor | |
| E217       | 7- X-collimator motor | |
| E218       | 8- Y-collimator motor | |
| E219       | 9- receptor rotation motor | |
| E220       | 10- receptor lift motor | Check C-arm board |
| E221       | 11- tube head lift motor | |
| E230       | 0- lift motor | Too high current detected in the motor and the movement has been stopped. |
| E231       | 1- shoulder motor PCB | |
| E232       | 2- elbow motor | |
| E233       | 3- temple rest motor | |
| E234       | 4- Dimax3 Ceph scan motor | |
| E235       | 5- C-arm rotation motor | |
| E236       | 6- receptor pan motor | |
| E237       | 7- X-collimator motor | |
| E238       | 8- Y-collimator motor | |
| E239       | 9- receptor rotation motor | |
| E240       | 10- receptor lift motor | Check C-Arm board |
| E241       | 11- tube head lift motor | |</p>
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>E250</td>
<td>0- lift motor</td>
<td>The motor drives the mechanism into the wrong position. Check sensors and cabling.</td>
</tr>
<tr>
<td>E251</td>
<td>1- shoulder motor PCB</td>
<td></td>
</tr>
<tr>
<td>E252</td>
<td>2- elbow motor</td>
<td></td>
</tr>
<tr>
<td>E253</td>
<td>3- temple rest motor</td>
<td></td>
</tr>
<tr>
<td>E254</td>
<td>4- Dimax3 Ceph scan motor</td>
<td></td>
</tr>
<tr>
<td>E255</td>
<td>5- C-arm rotation motor</td>
<td></td>
</tr>
<tr>
<td>E256</td>
<td>6- receptor pan motor</td>
<td></td>
</tr>
<tr>
<td>E257</td>
<td>7- X-collimator motor</td>
<td></td>
</tr>
<tr>
<td>E258</td>
<td>8- Y-collimator motor</td>
<td></td>
</tr>
<tr>
<td>E259</td>
<td>9- receptor rotation motor</td>
<td></td>
</tr>
<tr>
<td>E260</td>
<td>10- receptor lift motor</td>
<td></td>
</tr>
<tr>
<td>E261</td>
<td>11- tube head lift motor</td>
<td></td>
</tr>
</tbody>
</table>

**Directional error at**

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>E270</td>
<td>0- lift motor</td>
<td>Check C-Arm board</td>
</tr>
<tr>
<td>E271</td>
<td>1- shoulder motor PCB</td>
<td></td>
</tr>
<tr>
<td>E272</td>
<td>2- elbow motor</td>
<td></td>
</tr>
<tr>
<td>E273</td>
<td>3- temple rest motor</td>
<td></td>
</tr>
<tr>
<td>E274</td>
<td>4- Dimax3 Ceph scan motor</td>
<td></td>
</tr>
<tr>
<td>E275</td>
<td>5- C-arm rotation motor</td>
<td></td>
</tr>
<tr>
<td>E276</td>
<td>6- receptor pan motor</td>
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<tr>
<td>E277</td>
<td>7- X-collimator motor</td>
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<tr>
<td>E278</td>
<td>8- Y-collimator motor</td>
<td></td>
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<tr>
<td>E279</td>
<td>9- receptor rotation motor</td>
<td></td>
</tr>
<tr>
<td>E280</td>
<td>10- receptor lift motor</td>
<td></td>
</tr>
<tr>
<td>E281</td>
<td>11- tube head lift motor</td>
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**Timeout in mechanism controlled by**

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<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
<th>Comments</th>
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<tr>
<td>E282</td>
<td>12- secondary collimator</td>
<td>Check the functionality of the belt cables and the motor</td>
</tr>
<tr>
<td>E283</td>
<td>13- beam limiting device</td>
<td>Check the adjustments and the movement area</td>
</tr>
<tr>
<td>Error Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
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<tr>
<td>E301</td>
<td>Filament voltage</td>
<td>Missing completely</td>
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<tr>
<td></td>
<td></td>
<td>Too low during preheat</td>
</tr>
<tr>
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<td>Too high during preheat</td>
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<tr>
<td>E304</td>
<td></td>
<td>Dropped suddenly during exposure</td>
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<tr>
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<td></td>
<td>Cannot be enabled due to an internal error.</td>
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<tr>
<td>E305</td>
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<tr>
<td>E311</td>
<td>Tube voltages</td>
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</tr>
<tr>
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<td></td>
<td>Too low</td>
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<tr>
<td>E313</td>
<td></td>
<td>Too high</td>
</tr>
<tr>
<td>E314</td>
<td></td>
<td>Dropped suddenly without arching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(low frequency extreme detected)</td>
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<tr>
<td>E315</td>
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<td>Dropped suddenly without arching</td>
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<tr>
<td></td>
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<td>(extreme overcurrent detected)</td>
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<tr>
<td>E316</td>
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<td></td>
<td></td>
<td>(other reason)</td>
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<td>Detected during preheat period</td>
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<td>(maximum exceeded)</td>
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<td>E321</td>
<td>Tube Current</td>
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<td>Too low</td>
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<td>E323</td>
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<td>Too high</td>
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<td>E324</td>
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<td>Dropped suddenly without arching</td>
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<tr>
<td>E325</td>
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<td>Overshot suddenly without arching</td>
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<td>E331</td>
<td>Arching</td>
<td>Across X-ray tube, minor</td>
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<td>E332</td>
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<td>Across x-ray tube, severe</td>
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<td>E333</td>
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<td>At tube head anode end, minor</td>
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<td>E334</td>
<td></td>
<td>At tube head anode end, severe</td>
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<td>E335</td>
<td></td>
<td>At tube head cathode end, minor</td>
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<tr>
<td>E336</td>
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<td>At tube head cathode end, severe</td>
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<tr>
<td>E341</td>
<td>Monitoring errors</td>
<td>kV-signal (exposure time) too short/long</td>
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<td>E401</td>
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<tr>
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<td>between the FBK and the CAM PCB. Check also</td>
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<td>E403</td>
<td>KVNEG failure- shorted</td>
<td>the functionality of the FBK PCB.</td>
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<td>KVNEG failure- out of bounds</td>
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<td>MAPOS failure- shorted</td>
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<tr>
<td>E406</td>
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<td>MANEG failure- shorted</td>
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<td>MANEG failure- out of bounds</td>
<td>of the FBK PCB.</td>
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<td>FILAMENT failure- out of bounds</td>
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<td>kV-feedback imbalance</td>
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<td>E412</td>
<td>mA-feedback imbalance</td>
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<td>Tube head grounding error</td>
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<td>Temperature measurement error</td>
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<td>(signal out of bounds)</td>
<td>measurement sensor and the FBK PCB.</td>
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<td>Tube head electronics supply</td>
<td>Check the FBK PCB and the cabling between the</td>
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<td>voltage error</td>
<td>FBK and the CAM PCB</td>
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<td>Tube head not calibrated</td>
<td>Exposure not possible. Do a preheat calibration.</td>
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<td>Check the functionality of the FBK PCB.</td>
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<tr>
<td>E417</td>
<td>Tube head is of non-supported</td>
<td>Exposure not possible</td>
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<td>type</td>
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<td>Lift motor height position</td>
<td>Check the sensors and the cabling.</td>
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<td>Shoulder arm angle</td>
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<td>E423</td>
<td>Elbow arm angle</td>
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<td>E424</td>
<td>C-arm rotation angle</td>
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<tr>
<td>E425</td>
<td>Layer indicator position sensor</td>
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<td>E426</td>
<td>Soft tissue indicator sensor</td>
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<tr>
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<td>Shoulder arm angle</td>
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<tr>
<td>E434</td>
<td>C-arm rotation angle</td>
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<tr>
<td>E435</td>
<td>Layer indicator position sensor</td>
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<td>E436</td>
<td>Soft tissue indicator sensor error</td>
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<td>E441</td>
<td>Key stuck in Patient position control key pad</td>
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<td>Height adjusting up button</td>
<td>Check the button</td>
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<tr>
<td>E442</td>
<td>Height adjusting down button</td>
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<td>C-arm rotation clockwise button</td>
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<td>E444</td>
<td>C-arm rotation counterclockwise button</td>
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<td>Joystick not centered</td>
<td>Check the position of the joystick</td>
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<td>Joystick not released</td>
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<td>E447</td>
<td>Temple rest button</td>
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<td>E451</td>
<td>Key stuck elsewhere</td>
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<td>CEPH CA; Height adjusting up button</td>
<td>Check the button</td>
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<td>E452</td>
<td>CEPH CA; Height adjusting down button</td>
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<td>High voltage DC bus voltage too low</td>
<td>Check the power supply, voltage and the cabling. If needed change fuse</td>
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<td>26VDC bus voltage too high</td>
<td>Check the voltage</td>
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<td>26VDC bus voltage too low</td>
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<td>Heatsink temperature sensor failure</td>
<td>Check the sensor</td>
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<td>Power off did not function</td>
<td>Check the power supply</td>
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<td>Power supply overload (short)</td>
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<td>Mains frequency is out of bounds</td>
<td>Check the mains voltage and the power supply</td>
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<td>E601</td>
<td>Internal (CAM)</td>
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<td>Total data communication failure towards CAM</td>
<td>Exposure not possible. Check the cable of the CAM PCB and that it is installed correctly.</td>
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<td>E602</td>
<td>Total data communication failure from CAM</td>
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<td>E603</td>
<td>Data errors received at CAM</td>
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<tr>
<td>E604</td>
<td>Data errors received from CAM</td>
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<tr>
<td>E605</td>
<td>No clock signal received at CAM</td>
<td>Check the cable of the CAM PCB and that it is installed correctly.</td>
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<tr>
<td>E606</td>
<td>Data received is wrong polarity at CAM</td>
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<td>E607</td>
<td>No clock signal received from CAM</td>
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</tr>
<tr>
<td>E608</td>
<td>Data received is wrong polarity from CAM</td>
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<tr>
<td>Error Code</td>
<td>Explanation</td>
<td>Comments</td>
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<td>E611</td>
<td>Error in RTC-CPU communication</td>
<td>Check the RTC, CPU PCB and the cabling</td>
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<td>Error in RTC-FBK communication</td>
<td>Check the cabling between the CAM and FBK PCB. Check the functionality of the FBK PCB.</td>
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<tr>
<td>E612</td>
<td>Error in PAN AEC-CAM communication</td>
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<td>Error in CEPH AEC-CPU communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Error in Dimax –CPU communication</td>
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<tr>
<td>E613</td>
<td>Error in Dimax –CPU communication</td>
<td>Check the sensor is correctly installed to the X-ray unit.</td>
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<tr>
<td>E614</td>
<td>Error in PAN AEC-CAM communication</td>
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<td>Error in CEPH AEC-CPU communication</td>
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<td>E615</td>
<td>Error in Dimax –CPU communication</td>
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<td>E616</td>
<td>Error in Dimax –CPU communication</td>
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<tr>
<td>E617</td>
<td>Error in internal GUI –PCB communication</td>
<td>Check that the software versions of the X-ray unit and the GUI are compatible to each other.</td>
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<td>Error in external GUI-PCB communication</td>
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<td>E618</td>
<td>Error in internal GUI –PCB communication</td>
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<td>Error in external GUI-PCB communication</td>
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<tr>
<td>E619</td>
<td>Received non-implemented CAN message by CPU</td>
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<td>E620</td>
<td>Errors in PLANET ⇔ EXT data link</td>
<td>Check the cable and the software version of Admark. Restart the ProMax after attaching the Admark to it.</td>
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<td>E621</td>
<td>Errors in GUI –RS232 link to external keyboard.</td>
<td>Check the cabling and the connectors</td>
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<td>Errors in CPU-RS232 direct COM-port</td>
<td>Check the COM-port</td>
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<td>DIN PCB unable to communicate with the PC.</td>
<td>Check the DIN PCB and the cabling.</td>
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<td>Unable to contact server</td>
<td>Check the network connection and cabling</td>
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<td>No network activity for a prolonged time</td>
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<td>E626</td>
<td>Network disconnected</td>
<td>Check the functionality and installation of the Ethernet PCB.</td>
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<td>E627</td>
<td>TCP/IP address not set</td>
<td>Check the TCP/IP settings</td>
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<td>E628</td>
<td>Error in communication with 3D sensor</td>
<td>Check sensor connection</td>
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<td>E629</td>
<td>Ethernet cable is disconnected or it is broken</td>
<td>Check the Ethernet cable connection and cabling</td>
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<td>Comments</td>
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<td>------------------------------</td>
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<tr>
<td>E701</td>
<td>Missing calibration</td>
<td>Tube head filament definition not done</td>
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<td>Tube head kV-calibration not done</td>
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<td>E702</td>
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<td>Panoramic AEC not calibrated</td>
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<tr>
<td>E703</td>
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<td>Cephalometric AEC not calibrated</td>
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<td>E704</td>
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<td>Perfore preheat calibration</td>
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<td>E705</td>
<td>Preheat calibration</td>
<td>Problem during the preheat calibration</td>
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<td>Problem with the preheat calibration</td>
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<td>E801</td>
<td>Missing MCM module</td>
<td>1- shoulder motor</td>
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<td>2- elbow motor</td>
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<tr>
<td>E803</td>
<td></td>
<td>3- temple support/digital CEPH scan</td>
</tr>
<tr>
<td>E804</td>
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<td>4- C-arm rotation motor</td>
</tr>
<tr>
<td>E805</td>
<td></td>
<td>5- receptor pan /X&amp;Y collimation</td>
</tr>
<tr>
<td>E806</td>
<td></td>
<td>6- receptor rotation</td>
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<tr>
<td>E807</td>
<td></td>
<td>7- receptor lift / X&amp;Y collimation</td>
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<td>E808</td>
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<td>8- tube head lift function</td>
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<td>Missing internal parts</td>
<td>PAN-AEC not found</td>
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<td>CEPH-AEC not found</td>
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<td>E813</td>
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<td>RTC not found</td>
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<td>E814</td>
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<td>CAM not found</td>
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<td>E815</td>
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<td>Tube not found</td>
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<tr>
<td>E816</td>
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<td>Patient position keypad not found</td>
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<tr>
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<td>DIN module not found</td>
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<td>ETHERNET module not found</td>
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<thead>
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<th>Comments</th>
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<td><strong>Software compatibility</strong> System software must be upgraded. The version is too old with newly installed components</td>
<td>Check the software requirements of all components</td>
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<td>CAM FPGA version not compatible with main software</td>
<td>Check the software version of the ProMax</td>
</tr>
<tr>
<td>E823</td>
<td>GUI not compatible with newest SW</td>
<td>Check the software version of the GUI</td>
</tr>
<tr>
<td>E831</td>
<td><strong>Hardware compatibility</strong> A Dimax3 found but not a digital machine</td>
<td>Update the GUI software version</td>
</tr>
<tr>
<td>E832</td>
<td>Wrong type of PSU</td>
<td>Change the PSU PCB</td>
</tr>
<tr>
<td>E833</td>
<td>MCM is wrong type</td>
<td>Change the MCM PCB</td>
</tr>
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<td>E834</td>
<td>Dimax3 sensor version is too old</td>
<td>Dimax sensor version is too old or not compatible with the ProMax</td>
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<tr>
<td>E901</td>
<td>Main program. FLASH, Low block</td>
<td>Restart the ProMax</td>
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<td>E902</td>
<td>Main program FLASH, High block</td>
<td>Update the ProMax</td>
</tr>
<tr>
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<td>Memory Expansion module FLASH</td>
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<tr>
<td>E904</td>
<td>RTC PCB memory problem</td>
<td>Check the RTC PCB cabling and battery</td>
</tr>
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<td>Tube head FBK PCB memory error</td>
<td>Check the cabling and functionality of the FBK PCB</td>
</tr>
<tr>
<td>E906</td>
<td>PAN AEC memory problem</td>
<td>Change the cable / PSU PCB</td>
</tr>
<tr>
<td>E907</td>
<td>CEPH AEC memory problem</td>
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<tr>
<td>E908</td>
<td>Autofocus module problem</td>
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<tr>
<td>E911</td>
<td>DATA RAM BIT ERROR (even bank)</td>
<td>Check the CPU PCB and the cabling</td>
</tr>
<tr>
<td>E912</td>
<td>DATA RAM BIT ERROR (odd bank)</td>
<td></td>
</tr>
<tr>
<td>E913</td>
<td>FPGA register RAM error</td>
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</tr>
<tr>
<td>E914</td>
<td>CPU internal RAM error</td>
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</table>
ProMax 3D Internal Wire Diagram
ProMax Calibration Block Procedures

1. Open Dimax3 Tool by clicking Start, All Programs, Planmeca then Dimax3 Tool. (Figure 1)

   ![Figure 1]

2. Changing Binnings

   Click Settings and select Binnings then select the appropriate binning. (Figure 2)

   ![Figure 2]

   NOTE: There is no need to close and re-open Dimax3 Tool before selecting other binnings. Follow above instructions for checking the other binnings.

3. kV/mA settings

   3.a Dimax2

<table>
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<th>mA</th>
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   3.b Dimax3 v1

<table>
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<th>mA</th>
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   3.c Dimax3 v2

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</tr>
<tr>
<td>2x2</td>
<td>70</td>
<td>8</td>
</tr>
</tbody>
</table>
4. Click on **Calibrate** and select **Pan**. (Figure 3)

5. Turn the radiation off by pressing the smile in the middle right of the touch screen. (Figure 4)

   Press all the arrows at the bottom, turning each from white to red. (Figure 5)

5. Make sure that the blue calibration block is on the sensor and then take an exposure. (Figure 6)
6. Press **Ready** on the touch screen. Take an Exposure. (Figure 7)

![Figure 7](image)

7. Turn the radiation back on by pressing the smile again and all of the arrows on the bottom.

8. Press **Ready** on the touch screen. Take an Exposure. (See Figure 7)

9. The image will come out as showing a grey box with a black stripe in the center. (Figure 8)

![Figure 8](image)

The calibration files are automatically saved. Close Dimax3 Tool.
ProMax DEC Calibration Procedures

NOTE: Make that the beam alignment has already been done and that the unit software is 1.19.7 or later.

1. Attaching Flat Field Calibration Tool

a. Remove the tubehead covers

Loosen the two 2.5mm allen screws on the bottom of the tubehead and the two 3mm allen on the top of the tubehead. (Figure 1a-b)

![Figure 1a](image1a.png)  ![Figure 1b](image1b.png)

Loosen the two 3mm allen screws on the top of the tubehead and two 2.5mm allen screws to remove the rear cover. (Figure 2a-b)

![Figure 2a](image2a.png)  ![Figure 2b](image2b.png)

Place the flat field tool in front of the collimator and tighten then tubehead screws down to hold the tool in place. (Figure 3a-b)

![Figure 3a](image3a.png)  ![Figure 3b](image3b.png)
2. **Selecting Program**

Press **i**, **Technical Calibrations, DEC calibration, Panoramic DEC** (Figure 4)

**NOTE:** The password is 1701.

![Figure 4](image)

3. **OD Exposure**

**NOTE:** The displayed kV and mA are from the third patient size selection from the Main display screen.

Press **OD Exposure** and the screen will change to **Wait then Ready**. (Figure 5)

![Figure 5](image)
Press the exposure button and hold until the screen shows Complete. (Figure 6)

4. **Reference Value**

   **NOTE:** Any adjustments to the mA do not affect the Main displays settings.

   a. **Greater than 500**
      
      Press the mA value to the left to decrease the mA then retake the OD Exposure.

   b. **Lower than 150**
      
      Press the mA value to the right to increase the mA then retake the OD Exposure.

   c. **Near Zero**
      
      Re-adjust the Pan beam alignment.

   d. **1000+**
      
      The Flat Field tool is not covering the primary collimator properly.

5. **Testing DEC**

   **NOTE:** Make sure DEC is turned on, the normal + average jaw size is selected, and a patient is selected within their capturing software.

   a. **First Exposure**
      
      Take an exposure and after the exposure check that the kV and mA values have not changed.

   b. **Second Exposure**
      
      Increase the mA by 4mA from the original value.
      Take an exposure and after the exposure check that the kV and mA values have been decreased.
c. Third Exposure

Reduce the mA by 4mA from the original value.

Take an exposure and after the exposure check the kV and mA values have been increased.

6. Not adjusted correctly

NOTE: After all of these checks, redo the DEC calibration.

a. Make sure the DEC function is ON.
b. Check that the Pan beam alignments are correct.
c. Check that the Flat Field tool covers the collimator completely.

7. Maximum correction of set values

NOTE: The kV and mA values are increased or decreased in the same direction. I.E. if the measured value is 40% from the reference value, the kV value is increased 2kV and the mA value is increased by 3mA.

a. kV

The available kV range is 54-84kV and can be adjusted +4kv to -4kV.

b. mA

The available mA range is 1-16mA and can be adjusted +4mA to -3Ma
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1. REQUIRED TOOLS

1.1 Calibration Tools

1.2 Hand Tools

- 1.5mm allen wrench
- 2mm allen wrench
- 2.5mm allen wrench
- 3mm allen wrench
- 4mm allen wrench
Chapter B

Removing Covers

1  Upper C-arm

Unscrew the eight 2.5mm allen screws on top. (Figure 1)

Twist the cover away from the column and off. (Figure 2)

2  Tube head

Unscrew the top of the front tubehead cover with a 3mm allen (Figure 3a-b) and unscrew the bottom with a 2.5mm allen (Figure 3c) and remove the front cover.

Top

What is unscrewed

Bottom
3  **Shoulder**

Pull up on the shoulder cover. (Figure 4)

![Figure 4](image)

4  **Lower C-Arm**

Un-screw the four screws with a 2.5 allen. (Figure 5)

![Figure 5](image)

5  **Patient Positioning**

Un-screw the five screws with a 2.5 allen. (Figure 6)

![Figure 6](image)
6 Fixed Sensor Holder

Pull back on the inner cover of the sensor holder. (Figure 7)

Unscrew the two screws on the top of the rear cover of the holder with a 2.5mm allen. (Figure 8)

Take off the rear cover. (Figure 10)

Now turn the unit on and go to Primary Collimator.
Chapter C

Beam Alignment

1 Aligning the beam

Place a beam alignment tool into the sensor holder. (Figure 11)

Attach a fluorescent screen to the beam alignment tool. (Figure 12)

2 Primary Collimator

Press the i button in the lower left hand corner.

Press Technical Calibration, 60.0.

Type in 1701 as the password.

Press Primary Collimator, 61.0.
2.1 Pan mode X-Collimator (61.1)

Now press the exposure button to see where the beam is hitting the screen.

The beam image should appear within the borders of the rectangle markings on the screen. (Figure 13)

![Figure 13](image)

NOTE: The beam will need to be half of the distance of the box.

2.1.a X pan collimator position

If the beam is too left, press the right button

If the beam is too right, press the left button

Press Test and take another exposure.

2.1.a.i Too Narrow

Press the X-pan collimator width to the right
Press Test and take another exposure.

2.1.a.ii Too Wide

Press the X-pan collimator width to the left
Press Test and take another exposure.

If aligned then press Done and move onto the Y Collimator.
2.2 Pan mode Y Collimator (61.2)

Now check the top and bottom of the beam.

2.2.a Too High

Press the Y-pan collimator top limit button down.
Press Test and take another exposure.

2.2.b Too Low

Press the Y-pan collimator bottom limit button up
Press Test and take another exposure.
If aligned then press Done and move onto Ball Phantom.

2.2.c Angled

Press the i button in the lower left hand corner.

Press Technical Calibration, 60.0.

Press Primary Collimator, 61.0.

Press down once and select Collimator assembly screws visible, 61.9.

NOTE: 61.9 is available in software versions 1.19.7 or higher

Press Drive and the collimator will move to expose the screws.

The collimator will move to expose one screw then push the lower blade up and expose the second screw.

NOTE: This allows the two screws that adjust the angle to be visible.

2.2.c.i Angled Left/Right

Loosen the two hidden screws with a 2.5 mm allen.
Twist collimator to the right if angled Right to Left
Twist collimator to the left if angled Left to Right
Tighten down the screws and take another exposure.

Go back into Pan X-Collimator and Y-Collimator and press Test in both allowing the collimator to go to the home position.

Take another exposure. Press Done until you get back to the Technical Calibration Screen.
Chapter D

Beam Check

1 Setting up Beam Check

Press the i button.

Press Special Functions (40.0)

Press Beam Check (47.0)

Press Panoramic (47.1)

2 Computer Setup

NOTE: Make sure the sensor is in the sensor holder.

Click Start, All Programs, Planmeca, Beam Check.

Click on ProMax Pan

Click on Take the Image

Press Ready on the touch screen and then take an exposure.

Image should be centered on the top, bottom, left, and right. (Figure 14)

NOTE: The smaller image to the left is the entire sensor image.

Refer to pgs. 158-159 if not aligned properly.
Press Done and Exit

Close Beam Check and open Dimax3 Tool

1 Dimax3 Tool

Click on Start, All Programs, Planmeca then Dimax3 Tool.

Click on Calibrate and select Pan.

Follow the instructions on the computer screen.

1.1 Turning Radiation On/Off

1.1.a OFF

Press the smile in the middle right of the touch screen. (Figure 15)

Press all the arrows at the bottom and side, turning each from white to red.

1.1.b ON

Press the smile again. (See Figure 15) Then Press, all the arrows at the bottom and side, turning each from red to white.
1.2 kV/mA setting for Panoramic

NOTE: These are the settings for a Dimax3 version 2 sensor.

<table>
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<tr>
<th>Binnings</th>
<th>kV</th>
<th>mA</th>
</tr>
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<td>1</td>
</tr>
<tr>
<td>3x3</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>2x2</td>
<td>60</td>
<td>2</td>
</tr>
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</table>

1.3 Changing Binnings

Click Settings and select Binnings then select the appropriate binning.

Press Ready on the touch screen. Take an Exposure.

NOTE: Make sure that the correct kV/mA are being used for each binning.

The Image will come out as showing a grey box with a black stripe in the center. (Figure 16)

NOTE: There is no need to close and re-open Dimax3 Tool before selecting other binnings. Follow 1.3 for checking the other binnings.

The calibration files are automatically saved. Close Dimax3 Tool.
Chapter F

Ball Phantom

1 Setting up for ball phantom

Place the ball phantom in the patient positioning mechanism.

**NOTE**: Layer must be at 0mm before doing a ball phantom. If layer is not then adjust the thumb wheel till layer is at 0mm. (Figure 17)

![Figure 17](image)

Make sure the sensor is in the sensor holder.

**Setting the kV/mA**

Press the kV/mA at the top left of the touch screen. (Figure 18)

![Figure 18](image)

Select the 60kV / 4mA then click **OK**.

2 Setting up the computer

Click on **Start**, **All Programs**, **Planmeca**, **Romexis**.

Click on Find and then double click the **Test** patient. (Figure 21)

![Figure 21](image)
Click on Imaging on the left. (Figure 22)

Click on Pan at the top. (Figure 23)

Press Ready on the touch screen and take an exposure.

Click Done on the computer screen to evaluate the image for alignment. (Figure 24)

2.1 Calibrating and measuring image

Click on the CAL icon, and calibrate the Center Ball from top to bottom. (Figure 25)

NOTE: To create a line, left click to start the line and right click to complete the measurement.

Enter the number 7 when asked to input a distance. (Figure 26)

NOTE: Make sure Center Ball is round before moving onto the 10th ball distances.
2.1.a Center Ball

**NOTE:** Center ball will be above the midsagittal bar of the ball phantom. (Figure 27)

Click the icon below CAL and measure the top to bottom and left to right. (Figure 28)

The ball should be 7mm top to bottom and left to right. (Figure 29)

**2.1.a.i Too thin**

If the ball is too thin (Figure 30) then adjust worm gear in Pots.

Press \texttt{i} then select Technical Calibration (60.0) then select Position Sensor Calibration (64.0).

Press Position Sensor (64.1)

Press Check and write down what the shoulder position number is.
Put the locking pin into the c-arm/elbow. (Figure 31a-b)

Press Lock.

Press Release then twist the worm gear away from the column. (Figure 32)

NOTE: The new shoulder number should be higher than older number.

Press Lock and take the pin out and then press Done. Take another exposure and check ball size again. If not repeat until correct size.

2.1.a.ii Too Fat

If the ball is too fat (Figure 33) then adjust in Pots.

Press i then select Technical Calibration (60.0) then select Position Sensor Calibration. (64.0).

Press Position Sensor (64.1)

Press Check and write down what the shoulder position number is.

Put the locking pin into the c-arm/elbow. (Figure 34a-b)

Press Lock.
Press Release then twist the worm gear towards the column. (Figure 35)

![Figure 35](image)

NOTE: The new shoulder number should be lower than old number.

Press Lock and take the pin out and then press Done. Take another exposure and check ball size again. If not repeat until correct size.

2.1.b 10th Ball

Measure from the center of the Center Ball to the center on the 10th Ball on the right then measure from the center of the Center Ball to the center of 10th Ball on the left. (Figure 36)

![Figure 36](image)

NOTE: From the Center Ball, the distance left or right to the 10th Ball will always need to be the same.

2.1.b.i Too Left

If the distance from the Center Ball to the left is more than the right, then move the table away from the column. (Figure 37)

![Figure 37](image)
2.1.b.ii  Too Right

If the distance from the Center Ball to the right is more than the left, then move the table toward the column. (Figure 38)

![Figure 38](image)

2.1.b.iii  Moving the Table

NOTE: Call Planmeca Technical Support before proceeding at (630)-529-2300.

Loosen the four screws on the table with a 4mm allen. (Figure 39)

![Figure 39](image)

NOTE: Screws might be a Torx T25 instead of a 4mm allen

Physically push or pull the table to the left or right.

NOTE: Best way to adjust the table is to face the column with the table in the center of the body and gently push or pull depending on what is needed. (Figure 40a-b)

![Figure 40a](image)  ![Figure 40b](image)
2.1.c Shadow Ball

NOTE: The oval above the Center Ball is the shadow ball. (Figure 41)

If the shadow ball is too left or too right, then go into Pan mode X-Collimator.

Press the i button.

Press Technical Calibration

Press Primary Collimator

Press Pan mode X-collimator calibration.

2.1.c.i Too Left/ Too Right

If the shadow ball is too left press the X-Pan collimator pos left button.

Press Test then Done then take another exposure.

If the shadow ball is too right then press the X-Pan collimator post right button.

Press Test then Done then take another exposure.

3 Position Sensor Calibration (Pots)

NOTE: If the ball phantom image is good, then skip this section.

Press i then select Technical Calibration (60.0) then select Position Sensor Calibration. (64.0).

Press Position Sensor (64.1)

Press Check, Lock and then Release
Put the locking pins into the elbow/c-arm and in the shoulder (Figure 42a-c)

![Figure 42a](image1)

Press Lock

If the triangles are all green, then remove the pins and press Done

If any of the pots are red or not centered, align the according pot before removing the pins.

3.1 Aligning Pots

3.1.a Shoulder

Unscrew the set screw with a 1.5mm allen to get the sensor coupling off of the spindle. (Figure 43)

![Figure 43](image2)

Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 44)

![Figure 44](image3)
Put sensor coupling back onto spindle and re-tighten set screw. Re-check still in the green and center.

When aligned take out the pins then press Done.

3.1.b Elbow

Unscrew the set screw with a 2mm allen to get the sensor holder off of the cable guide. (Figure 45)

![Figure 45](image)

Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 46)

![Figure 46](image)

When aligned take out the pins then press Done.

3.1.c C-Arm

Unscrew the set screw with a 2mm allen to get the sensor coupling off of the spindle. (Figure 42)

![Figure 42](image)
Watch the numbers on the touch screen and rotate spindle until in the Green and center. (Figure 47)

When aligned take out the pins then press Done.

4 Patient Positioning Lights Alignment

After aligning the Ball Phantom, turn the patient positioning lights on by pressing the temple support button. (Figure 48)

Place the Ball Phantom into the patient positioning mechanism with the Frankfort plane alignment tool on top of the Ball Phantom. (Figure 49)

NOTE: Make sure the layer light is on the line of the ball phantom then zero out the layer light.

Press then press Technical Calibration (60.0)
Press Layer laser calibration (66.0)
Press Done and now layer is zeroed out.
4.1 Focal Layer Light Beam

If the focal layer light is not straight on the Ball Phantom, then finger adjust the laser until it lines up. (Figure 50)

4.2 Frankfort Light Beam

If the Frankfort light is not straight on the Frankfort plane tool, then adjust the laser. (See Figure 50)

4.3 Midsagittal Light Beam

If the Midsagittal light is not lined up with the center line on the Ball phantom, then finger adjust the laser until it lines up. (See Figure 50)
1 Getting into Cephalometric Mode

Press Pan.

Press Ceph.

Press Go Ceph on the bottom in the middle.

2 Removing Cephalometric Covers

2.1 Top covers

NOTE: All eight hidden screws are 3mm allens

Rotate the head support to 45º position towards the front of the column and unscrew #1. (Figure 51)
Rotate the head support to the 0° position and unscrew #2. (Figure 52)

![Figure 52]

Rotate the head support to the 45° position away from the front of the column and unscrew #3. (Figure 53)

![Figure 53]

Rotate the head support to the 135° position and unscrew #4 and #5. (Figure 54)

![Figure 54]

Rotate the head support to the 150° position and unscrew #6 and #7. (Figure 55)

![Figure 55]
Unscrew the inner attachment screw and take off the covers. (Figure 56)

![Figure 56](image)

2.2 Secondary Collimator Covers

Unscrew the 2mm screw on the bottom of the collimator cover. (Figure 57.2)

![Figure 57](image)

Unscrew the two 4mm screws holding the cover box to the top of the collimator. (Figure 57.1)

3 Beam Alignment

Attach a fluorescent screen to the beam alignment tool.

3.1 Ceph mode C-arm rotation (61.5)

Press

Press Technical calibration (60.0)

Press Primary collimator (61.0)

Press Ceph mode C-arm rotation (61.5)

3.1.a Ceph Mode Beam Right Position

NOTE: Make sure the beam alignment tool is on the Pan side.

Press Test on the bottom and take an exposure.
Beam should be hitting from the center to the right on the screen. (Figure 58)

Figure 58

If not aligned, adjust **Ceph mode C-arm rotation**.

### 3.1.a.i Too Left/Right

If the beam is too left, move the Ceph mode beam right position to the right.

Press **Test** on the top and take another exposure.

If the beam is too right, move the Ceph mode beam right position to the left.

Press **Test** on the bottom and take another exposure.

If aligned then press **Done** move onto Ceph mode C-arm rotation.

### 3.1.b Ceph Mode C-arm Rotation

NOTE: Make sure the beam alignment tool is in the ceph holder.

Press **Test** on the bottom and take an exposure. Beam should be hitting from the center to the right on the screen. (Figure 59)

Figure 59

If not aligned, adjust **Ceph mode C-arm rotation**.
3.1.b.i Too Left/Right

If the beam is too left, move the Ceph mode C-arm rotation to the right.

Press Test on the bottom and take another exposure.

If the beam is too right, move the Ceph mode C-arm rotation to the left.

Press Test on the bottom and take another exposure.

If aligned then press Done move onto Ceph mode beam position.

3.2 Ceph mode beam position (61.6)

Press Ceph mode beam position.

Press Test and take an exposure. Beam should cover the center of the fluorescent screen with a bit of overlap on either side of the center lines. (Figure 60)

Adjust if the beam is off.

3.2.a Too Left/Right

If the beam is too left, move the x-right limit to the right.

Press Test and take another exposure.

If the beam is too right, move the x-right limit to the left.

Press Test and take another exposure. If the beam is aligned then press Done and move onto the Ceph y-collimator.
3.3  Ceph y-collimator calibration (61.4)

Attach the two fluorescent screens to the beam alignment tool. (Figure 61a-b)

Press Ceph y-collimator calibration (61.4) and take an exposure.

Image should come out as covering top to bottom on the fluorescent screens. (Figure 62)

3.3.a Too High

Press the y-top limit down and y-bottom limit down.

Press Test and take another exposure. If the beam is aligned then press Done and Move onto the Secondary collimator (beaver tail)

3.3.b Too Low

Press the y-top limit up and y-bottom limit up.

Press Test and take another exposure. If the beam is aligned then press Done. Move onto the Secondary collimator (beaver tail).
4 Ceph Head Leveling

Put the left and right ear posts into their respective holders. (Figure 63)

Click on Start then Run.
Type in pmsample then click OK
Uncheck Use calibration.
Click on Cephalo.
Set the kV / mA to 60 kV and 4 mA
Press Ready on the GUI.
Ball should be within ring. (Figure 64)

4.1 Too Left

If the ball is too left then adjust arm at points in Figure 65.

Loosen #4 a quarter of a turn then loosen up #1 and #2.
Turn #3 toward the column and retighten #1 and #2. Also retighten #4 a quarter of a turn.
Take another exposure. If aligned, re-check Beam check.
4.2 Too Right

If the ball is too right then adjust arm at points in Figure 66.

![Figure 66](image)

Loosen #4 a quarter of a turn then loosen up #1 and #2.

Turn #3 away from the column and retighten #1 and #2. Also retighten #4 a quarter of a turn.

Take another exposure. If aligned, re-check Beam check.

4.3 Too Low

If the ball is too low then adjust arm at points in Figure 67.

![Figure 67](image)

Loosen #1 a quarter of a turn then loosen up #3 and tighten down #2.

Take another exposure. If aligned then tighten #1 a quarter turn. If aligned, re-check Beam check.

4.4 Too High

If the ball is too high then adjust arm at points in Figure 68.

![Figure 68](image)
Loosen #1 a quarter of a turn then loosen up #2 and tighten down #3.

Take another exposure. If aligned then tighten #1 a quarter turn. If aligned, re-check Beam check

5 Secondary Collimator (Beaver Tail)

Unscrew the three 3mm allen screws. (Figure 70a-b)

Attach the collimator and screw in the three 3mm allens. (Figure 71a-b)

Press i then **Technical calibration** then **Primary Collimator** and select **Ceph mode beam position** (61.6)

Press Test and take an exposure.

The beam should be in the boxes of the fluorescent screens. (Figure 72)

5.1 Too Left

Loosen the two 3mm screws closest to the column. (Figure 73)
Loosen the nut on the left and right locking screws. (Figure 74)

![Figure 74](image)

Loosen the right 3mm locking screw and tighten the 3mm left locking screw. (Figure 75)

![Figure 75](image)

Take another exposure. If aligned tighten the right nut and tighten the two screws on the bottom.

Move onto Beam Check.

5.2 Too Right

Loosen the two 3mm screws closest to the column. (Figure 76)

![Figure 76](image)
Loosen the nut on the left and right locking screws. (Figure 77)

Loosen the left 3mm locking screw and tighten the 3mm right locking screw. (Figure 78)

Take another exposure. If aligned tighten the left nut and tighten the two screws on the bottom.

Move onto Beam Check.

5.3 Too Low

Loosen the two 3mm allen screws on the inside of the collimator. (Figure 79)

Tighten the 3mm locking screw on the outside, closest to the column. (Figure 80)

Take another exposure. If aligned then retighten the inner screws and move onto Beam Check.
5.4 Too High

Loosen the two 3mm allen screws on the inside of the collimator. (Figure 81)

![Figure 81]

Loosen the 3mm locking screw on the outside, closet to the column. (Figure 82)

![Figure 82]

Take another exposure. If aligned then re-tighten the inner screws and move onto Beam Check.

5.5 Angled

5.5.a Left

If angled left, then loosen the nuts and loosen the right locking screw and tighten the left locking screw. (Figure 83)

![Figure 83]

Take another exposure. If aligned then re-tighten the nuts and move onto Beam Check.

5.5.b Right

If angled right, then loosen the nuts and loosen the left locking screw and tighten the right locking screw. (Figure 84)

![Figure 84]

Take another exposure. If aligned then re-tighten the nuts and move onto Beam Check.
6 Beam Check

6.1 Setting up beam check

Press the i button
Press Special Functions (40.0)
Press Beam Check (47.0)
Press Cephalometric (47.1)

6.2 Computer Setup

NOTE: Make sure the sensor is in the sensor holder.

Click Start, All Programs, Planmeca, Beam Check.

Click on ProMax Ceph.

Press Take the Image.

Take an exposure. The image should be the same on the top, bottom, left, and right. (Figure 85)

NOTE: The Left top sensor grid in version 1.21.4 or later might not be there which is normal.

![Figure 85](image-url)
7 Calibrating

Press Exit on the touch screen, if just finished doing a Beam Check.

7.1 kV / mA for Cephalometric

NOTE: These settings are for a Dimax3 v2 sensor.

<table>
<thead>
<tr>
<th>Binnings</th>
<th>kV</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x4</td>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>3x3</td>
<td>60</td>
<td>7</td>
</tr>
</tbody>
</table>

Place the Cephalostat calibrating tool (hatchet) into the patient’s right ear post holder with the point going towards the back or column. (Figure 86)

![Figure 86](image)

NOTE: Change binnings by clicking Settings and select Binnings then the appropriate binning in Dimax3 tool. (Figure 87)

![Figure 87](image)

7.2 Computer Setup

Click on Start, All Programs, Planmeca then Dimax3 Tool.

7.3 Dimax3 Tool

Click on Calibrate then select Ceph.

Click Ready on the touch screen and take an exposure

NOTE: image will come out as being a grey hatchet with black around it. (Figure 88)

![Figure 88](image)
Press the “L” key on the keyboard of the computer to give calibration lines. This gives the point where the images are combined in the computer.

Click the magnify glass (+) to zoom in on the lines to check combination.

NOTE: There is a + / - 2 clicks left or right on the keyboard to get aligned left to right.

7.3.a Not together

If the image comes out separated check to make sure that the hatchet is placed in the holder correctly. Re-do Beam Check.

7.3.a.i Raising up

If hatchet is place correctly, then raise the beaver tail up.

Loosen the two screws on the inside of the beaver tail and tighten the vertical screw on the outside of the beaver tail.

(Figure 89a-b)
ProOne
I. Phone Jack

Wall Exposure:

Hand Held Exposure:
II. RJ12 (Punch Down)

Wall Exposure:

NOTE: The wires are going to cross between the two jacks.

### RJ12 Wiring Configuration

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
</tr>
<tr>
<td>2</td>
<td>Orange White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
</tr>
</tbody>
</table>

**Unit Jack**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

**Remote Jack**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
III. RJ45 (Punch Down)

Wall Exposure:

Wiring Configuration 568A
- Pin 1: Not used
- Pin 2: Green = RDYIND
- Pin 3: Orange White = EXPIND
- Pin 4: Not used
- Pin 5: Not used
- Pin 6: Orange = VCC
- Pin 7: Brown White = EXPOUT
- Pin 8: Not used

Wiring Configuration 568B
- Pin 1: Not used
- Pin 2: Orange = RDYIND
- Pin 3: Green White = EXPIND
- Pin 4: Not used
- Pin 5: Not used
- Pin 6: Green = VCC
- Pin 7: Brown White = EXPOUT
- Pin 8: Not used

Exposure Switch connections:
- TERMINAL = ON
- VCC
- EXPOUT

NOTE: 568B Configuration is shown.
ProOne Dimensions

* = +10 mm (0.4 in.) with optional extension plate
Updating Unit Software

1. Turn unit off.
2. Remove the two 2mm allen screws covering the plug ports. (Figure 1)

![Figure 2](image)

3. Plug USB Flash drive into the USB port on the back of the Unit.
4. Turn the unit on.
5. Press Wrench in the upper right hand corner.
6. Scroll down to Program Update and press it.
7. Press Update to start the update.

**NOTE:** The unit will reboot after it has been updated.

8. Once the home screen appears again, turn the unit off.
9. Remove the USB Flash Drive and turn the unit back on.

**NOTE:** Make sure that a load progress screen appears when it is turned back on. Once the home screen appears, the update is completed.
ProOne Column Travel Adjustment

Spindle Carriage Assembly Adjustment

1. Lock the moving column into position by inserting two locking pins into the back of the column. Carefully drive the moving column up/down until the locking pin holes are in the correct position. Insert the locking pins into the holes.

2. Open the column door. Then drive the lift motor down until the lift motor cables have slackened.
3. Turn the X-ray off.
4. Rotate the lower steel cable pulley until the pulley hole lines up with the spindle shaft.

5. Loosen the locking screw with a 2mm Allen to free the spindle shaft. Remove the shaft by firmly pushing it from the back and pulling it out from the front.

6. Turn the X-ray back on.
7. Use the height adjustment arrow to raise the lift motor shaft until it clears the spindle carriage assembly.
8. Turn the X-ray off.
9. Loosen the four screw of the spindle carriage assembly.

10. Adjust the spindle carriage assembly until the lower steel cable pulley and the column are evenly spaced. Then tighten the four screws.

11. Turn the X-ray on.

12. Use the height adjustment arrow to lower the lift motor shaft until the spindle shaft can be inserted. Tighten the locking screw.

13. Use the height adjustment arrow to slowly raise the lift motor shaft until the locking pin can be removed from the back of the column.

14. Test the column travel. If the adjustment did not fix the issue, then proceed to the next process.
Column Alignment

1. Please refer to the previous steps 1-5 of the Spindle Carriage Assembly Adjustment to begin removing the lift motor.
2. Remove the screws that hold the cable clamp into position. Disconnect the lift motor cable (J4) from the CPU PCB.

3. Remove the upper arm cover.

4. Remove the four screws that attach the lift motor mounting block to the upper arm frame.
5. Remove the lift motor.

6. Remove the upper securing plate. Then remove the upper cable pulley.

7. Loosen the eight screws that are attached to the slide blocks. Each slide block has two screws.

8. Use a spirit level to adjust the level of the moving column to the stationary column. Tighten all the screws while adjusting the level.

9. Reassemble all parts in reverse order and test.
# ProOne Help/Error Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>H02-001</td>
<td>Lift motor</td>
<td>Upper limit: The lift motor has reached the upper limit or there is no signal from the sensor.</td>
</tr>
<tr>
<td>H02-002</td>
<td></td>
<td>Lower limit: The lift motor has reached the lower limit or there is no signal from the sensor.</td>
</tr>
<tr>
<td>H02-003</td>
<td></td>
<td>Temperature too high: The lift motor power supply temperature has reached the upper limit or there is a short circuit.</td>
</tr>
<tr>
<td>H02-014</td>
<td></td>
<td>Duty cycle: The specified load limit for the lift motor has been exceeded. Wait two minutes for the motor to cool down.</td>
</tr>
<tr>
<td>H03-001</td>
<td>Exposure switch</td>
<td>Button released before the end of the exposure: Press and hold down the exposure switch button for the entire duration of the exposure.</td>
</tr>
<tr>
<td>H04-001</td>
<td>USB</td>
<td>Communication problem: The system cannot recognize the connected USB device.</td>
</tr>
<tr>
<td>H04-002</td>
<td>Ethernet</td>
<td>Unable to connect to the Ethernet network during image data transfer.</td>
</tr>
<tr>
<td>H04-003</td>
<td></td>
<td>No network activity. Check the network connection and cabling.</td>
</tr>
<tr>
<td>H05-020</td>
<td>USB</td>
<td>Power Supply: Current too high.</td>
</tr>
<tr>
<td>H05-021</td>
<td>Frankfort positioning light</td>
<td>Current too high. Replace frankfort light.</td>
</tr>
<tr>
<td>H05-022</td>
<td>Midsagittal positioning light</td>
<td>Current too high. Replace midsagittal light.</td>
</tr>
<tr>
<td>H05-023</td>
<td>Layer light</td>
<td>Current too high. Replace layer light.</td>
</tr>
<tr>
<td>H06-001</td>
<td>Emergency stop button</td>
<td>Button activated: All movements of the X-ray are blocked, no radiation is generated. Pull the emergency stop button out to resume normal operation.</td>
</tr>
<tr>
<td>H06-003</td>
<td>Dimax Sensor</td>
<td>Radiation level too low: The radiation level is below average or factory settings.</td>
</tr>
<tr>
<td>H06-004</td>
<td></td>
<td>Beam not symmetrical: The collimator has to be re-adjusted.</td>
</tr>
<tr>
<td>H06-008</td>
<td></td>
<td>Not ready for exposure: Sensor warming time too short.</td>
</tr>
<tr>
<td>H06-009</td>
<td>X-ray tube</td>
<td>Heating capacity: The specified limit for the X-ray was exceeded.</td>
</tr>
<tr>
<td>H06-010</td>
<td>Tube head</td>
<td>Temperature too high: The specified limit for the tube head oil temperature was exceeded.</td>
</tr>
<tr>
<td>Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>H06-014</td>
<td>DEC</td>
<td>Segmenting not possible</td>
</tr>
<tr>
<td>H06-15</td>
<td>DEC</td>
<td>DEC not available</td>
</tr>
<tr>
<td>H07-002</td>
<td>Licenses</td>
<td>Wrong code</td>
</tr>
<tr>
<td>H07-003</td>
<td>DEC</td>
<td>DEC cannot be switched on</td>
</tr>
<tr>
<td>H07-004</td>
<td></td>
<td>Target value too low/high</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>E02-004</td>
<td>Lift motors</td>
<td>Drive current</td>
</tr>
<tr>
<td>E02-006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E02-007</td>
<td>Linear Movement</td>
<td>Directional error</td>
</tr>
<tr>
<td>E02-008</td>
<td>Temple Supports</td>
<td></td>
</tr>
<tr>
<td>E02-009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E02-010</td>
<td>Rotation Movement</td>
<td></td>
</tr>
<tr>
<td>E02-011</td>
<td>Collimator Movement</td>
<td></td>
</tr>
<tr>
<td>E02-012</td>
<td>Lift Motor</td>
<td>Limit sensors</td>
</tr>
<tr>
<td>E02-013</td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>E02-002</td>
<td>Tube voltage</td>
<td>kV exceeded</td>
</tr>
<tr>
<td>E02-003</td>
<td></td>
<td>kV exceeded at anode side</td>
</tr>
<tr>
<td>E02-004</td>
<td></td>
<td>kV exceeded at cathode side</td>
</tr>
<tr>
<td>E02-005</td>
<td></td>
<td>kV too low</td>
</tr>
<tr>
<td>Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>E03-006</td>
<td>Tube voltage</td>
<td>kV out of limits Do a preheat calibration, if needed replace the PSU assembly then tube head.</td>
</tr>
<tr>
<td>E03-007</td>
<td></td>
<td>kV too low at anode side Do a preheat calibration, if needed replace the tube head</td>
</tr>
<tr>
<td>E03-008</td>
<td></td>
<td>kV feedback circuit Replace the PSU assembly/tube head</td>
</tr>
<tr>
<td>E03-009</td>
<td></td>
<td>kV too low Do preheat calibration, if needed replace PSU assembly/tube head.</td>
</tr>
<tr>
<td>E03-010</td>
<td>Tube current</td>
<td>mA out of limits Do a preheat calibration, if needed replace tube head.</td>
</tr>
<tr>
<td>E03-011</td>
<td></td>
<td>mA out of limits</td>
</tr>
<tr>
<td>E03-012</td>
<td></td>
<td>mA preheat values out of limits Replace the PSU assembly and do preheat calibration.</td>
</tr>
<tr>
<td>E03-013</td>
<td></td>
<td>mA feedback circuit</td>
</tr>
<tr>
<td>E03-017</td>
<td>Tube voltage</td>
<td>kV too low at cathode side Do a preheat calibration, if needed replace tube head.</td>
</tr>
<tr>
<td>E03-019</td>
<td>Tube head</td>
<td>kV too low and mA too high Replace tube head and do preheat calibration.</td>
</tr>
<tr>
<td>E03-020</td>
<td></td>
<td>kV too low and mA+ too high</td>
</tr>
<tr>
<td>E03-021</td>
<td></td>
<td>kV too low and mA- too high</td>
</tr>
<tr>
<td>E04-006</td>
<td>CAN</td>
<td>Communication between CPU and PSU not working Check the cabling, if needed replace PSU assembly then CPU PCB</td>
</tr>
<tr>
<td>E04-007</td>
<td>Dimax (CPU)</td>
<td>Communication between Dimax Sensor and CPU not working Check cabling, if needed replace CPU PCB then Dimax sensor</td>
</tr>
<tr>
<td>E04-008</td>
<td></td>
<td>No preview image Replace CPU PCB</td>
</tr>
<tr>
<td>E04-009</td>
<td>SPI flash (CPU)</td>
<td>No connection to SPI flash memory</td>
</tr>
<tr>
<td>E04-010</td>
<td>SPI screen (CPU)</td>
<td>No connection to touch panel control Check cabling, if needed replace CPU PCB then control panel</td>
</tr>
<tr>
<td>E04-011</td>
<td>TWI (CPU)</td>
<td>No connection to EEPROM chip Check that the EEPROM chip on the CPU PCB is properly attached and no damage to pins</td>
</tr>
<tr>
<td>E04-012</td>
<td>SCI (CPU)</td>
<td>Communication between processors not working Replace CPU PCB</td>
</tr>
<tr>
<td>E04-013</td>
<td>FPGA</td>
<td>No connection to FPGA logic chip</td>
</tr>
<tr>
<td>E04-014</td>
<td>NAND flash</td>
<td>No connection to NAND flash program memory</td>
</tr>
<tr>
<td>Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>E04-015</td>
<td>SDRAM</td>
<td>No connection to SDRAM lower memory slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No connection to SDRAM upper memory slot</td>
</tr>
<tr>
<td>E04-017</td>
<td>No connection to control panel SDRAM memory</td>
<td></td>
</tr>
<tr>
<td>E04-018</td>
<td>Ethernet</td>
<td>No connection to Ethernet transmitter</td>
</tr>
<tr>
<td></td>
<td>Exposure switch</td>
<td>Indicator signal for ready status not working</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indicator signal for exposure not working</td>
</tr>
<tr>
<td>E05-004</td>
<td>Motors (CPU)</td>
<td>Motor control supply voltage does not rise fast enough</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MVCC &lt; 2V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the cabling by connecting/re-connecting linear movement motor, lift motor, temple support motor. If need be replace CPU PCB.</td>
</tr>
<tr>
<td>E05-005</td>
<td></td>
<td>Power supply switch for motors short circuited</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MVCC &gt; 10 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace CPU PCB</td>
</tr>
<tr>
<td>E05-006</td>
<td>30 V (CPU)</td>
<td>Lift motor voltage too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step motor voltage too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MVCC &lt; 23VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage, if needed replace the CPU PCB</td>
</tr>
<tr>
<td>E05-008</td>
<td>Control panel (CPU)</td>
<td>LCD voltage out of limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MONLCD3V3 &gt; +/-5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage and replace the CPU PCB</td>
</tr>
<tr>
<td>E05-009</td>
<td>3V3 (CPU)</td>
<td>Mains voltage out of limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MON3V3 &gt; +/-5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage between TP5 and TP8</td>
</tr>
<tr>
<td>E05-010</td>
<td>5V (CPU)</td>
<td>USB/Touch panel control voltage out of limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MON5V +/- 5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltages between TP4 and TP8</td>
</tr>
<tr>
<td>E05-011</td>
<td></td>
<td>Limit sensors’ voltage out of limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MONLIM5V &gt; +/-5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltages between TP2 and TP8</td>
</tr>
<tr>
<td>Code</td>
<td>Explanation</td>
<td>Comments</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>E05-012</td>
<td>Line voltage</td>
<td>Line voltage too low in stand-by situation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check incoming voltage, if fluctuates between 90-264V get a UPS system</td>
</tr>
<tr>
<td>E05-013</td>
<td>Dimax (PSU)</td>
<td>Camera voltage too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage between J2-1 and J2-2</td>
</tr>
<tr>
<td>E05-014</td>
<td>Rotation movement (PSU)</td>
<td>Positioning sensors current too high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage between J8-1 and J8-3</td>
</tr>
<tr>
<td>E05-015</td>
<td>Generator (PSU)</td>
<td>Mid-circuit voltage too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace the PSU assembly and do a preheat calibration</td>
</tr>
<tr>
<td>E05-016</td>
<td>30 V (CPU)</td>
<td>CPU voltage too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the voltage between TP7 and TP8</td>
</tr>
<tr>
<td>E06-005</td>
<td>Heat limit</td>
<td>IMS card temperature too high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wait for unit to cool off</td>
</tr>
<tr>
<td>E06-011</td>
<td>Tube head</td>
<td>Tube head temperature too low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wait for tube head to warm up. If needed replace the tube head.</td>
</tr>
<tr>
<td>E06-012</td>
<td>Tube head</td>
<td>Tube head temperature measurement circuit open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace tube head and perform the preheat calibration</td>
</tr>
<tr>
<td>E06-013</td>
<td>PSU</td>
<td>Exposure time too long</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace PSU assembly and do a preheat calibration. If needed replace CPU PCB.</td>
</tr>
<tr>
<td>E07-001</td>
<td>Tube head</td>
<td>mA calibration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do a preheat calibration</td>
</tr>
</tbody>
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PLANMECA
ProOne

Calibration Manual
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Chapter A

General Information

1. DISCLAIMER

This manual contains the information required to setup and calibrate the Planmeca ProOne Panoramic unit with 1.5.0.0 software.

**WARNING:**
Protect yourself from radiation when you are checking the beam alignment and calibrating. Since radiation safety requirements vary from state to state, country to country, it is the responsibility of the installer to ensure that the correct precautions are observed.

1.1 The display values shown in this guide are only examples and should be interpreted as recommended values unless otherwise specified.

2. REQUIRED TOOLS

2.1. Calibration Tools

- Ball phantom (part number 10004011) used for checking the position of the Patient Positioning Mechanism and the Positioning lights. (Figure 1)

![Figure 1](image1.png)

- Frankfort plane alignment tool (part number 50977) used with the ball phantom for checking the position of the Frankfort plane light. (Figure 2)

![Figure 2](image2.png)
- Beam alignment tool, fluorescent screen, (part number 50972) used for checking the position of the x-ray beam. (Figure 3)

![Figure 3](image1.png)

- Alignment Ruler (part number 50973) used for checking the alignment of the patient positioning mechanism. (Figure 4)

![Figure 4](image2.png)

- Calibration block (part number 10016995) used for calibrating the sensor. (Figure 5)

![Figure 5](image3.png)

- Alignment Pins (part number 7100) used for locking the c-arm into positioning for checking alignment. (Figure 6)

![Figure 6](image4.png)

2.2 Hand Tools

- 2.5 mm allen wrench
- 4 mm allen wrench
- Needle Nose Pliers
Chapter B

Pre-Check

1 Romexis

Click on Start, All Programs, Planmeca, Romexis.

NOTE: Place the ball phantom into the patient positioning mechanism.

2 Ball Phantom Test

Click on **Find** and then double click the **Test** patient. (Figure 7)

![Figure 7](image)

Click on **Imaging** on the left. (Figure 8)

![Figure 8](image)

Click on Pan at the top. (Figure 9)

![Figure 9](image)

Press **Ready** on the touch screen and take an exposure.

Click **Done** on the computer screen to evaluate the image for alignment. (Figure 10)

![Figure 10](image)

2.1 Measurement Tool Calibration

Click on the CAL icon, and calibrate the Center Ball from top to bottom. (Figure 11)

NOTE: To create a line, left click to start the line and right click to complete the measurement.

![Figure 11](image)
Enter the number 7 when asked to input a distance. (Figure 12)

2.2 Measuring Image

Click the icon below CAL and measure the top to bottom and left to right. (Figure 13)

The ball should be 7mm top to bottom and left to right. (Figure 14)

Measure from the center of the Center Ball to the center on the 10th Ball on the right then measure from the center of the Center Ball to the center of 10th Ball on the left.

NOTE: To be able to measure to the tenth ball, make sure that the image is zoomed in as much as possible. Click on show overview. Use the over screen to move to the tenth balls. (Figure 15)

The 10th ball needs to be +/-2mm.

Now check the shadow ball by clicking the Vertical Line from point icon from the measurement toolbar. (Figure 16)
Click the top of the shadow ball and measure the distance between the shadow ball to the Center Ball. (Figure 17)

NOTE: If any of these distances are off then continue on with Chapter C-F. If the measurements are within the tolerances then the ProOne is calibrated.
Chapter C

Removing Covers

1  **Upper Arm**
   Take the Upper Arm cover off by pulling straight up. (Figure 18)  
   
   ![Figure 18](image18)

2  **Sensor Head**
   Loosen the 2.5mm allen screw on the top of the Sensor Head cover then pull the cover off. Also loosen the 2.5 on the bottom of the cover. (Figure 19-20)  
   
   ![Figure 19](image19)  
   ![Figure 20](image20)

3  **Inner Tubehead**
   Loosen the 2.5mm allen screw on the bottom of the Tubehead cover then pull the cover off. (Figure 21)  
   
   ![Figure 21](image21)

4  **Inner C-Arm**
   Pull the C-Arm cover straight down from its position to remove it. (Figure 22)  
   
   ![Figure 22](image22)
Chapter D

Alignment

1 Beam Adjustment

Press the wrench to get to the configuration options. (Figure 23)

Press Technical. (Figure 24)

It will ask for a password which is 1701 then press **Calibrations**. (See Figure 20)

Press **Collimator calibration** to check the beam alignment. (Figure 25)
Attach the fluorescent screen to the sensor head. (Figure 26)

Press Test to check the beam. (Figure 27)

<table>
<thead>
<tr>
<th>Collimator calibration</th>
<th>T9120</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collimator position</strong></td>
<td><img src="image" alt="Collimator position" /></td>
</tr>
<tr>
<td>Front blade</td>
<td><img src="image" alt="Front blade" /></td>
</tr>
<tr>
<td>Position</td>
<td><img src="image" alt="Position" /></td>
</tr>
<tr>
<td>Exposure time</td>
<td><img src="image" alt="Exposure time" /></td>
</tr>
</tbody>
</table>

1.1 Vertical Alignment

1.1.a High/Low

Loosen the two 2.5mm allen screws and slide the collimator up/down accordingly. (Figure 28)

Press Test and take another exposure. If beam is aligned press the green check in the lower right corner to save the changes.

1.1.b Angled

Loosen the bottom 2.5mm allen screws and rotate the collimator left/right accordingly to get the beam straight. (Figure 29)
Press Test and take another exposure. If beam is aligned press the green check in the lower right corner to save the changes.

**NOTE** If still unable to fix the vertical alignment, loosen the three 2.5mm allen screws on the Sensor Head and make further adjustments there. (Figure 30)

![Figure 30](image)

**1.2 Horizontal Alignment**

1.2.a **Left/Right**

Press the respective left or right button under Collimator Position to move the collimator to the left or right. (Figure 31)

![Figure 31](image)

Press Test and take another exposure. If beam is aligned press the green check in the lower right corner to save the changes.

**1.3 Front Blade Position**

On the home screen, select Child and Standard Pan. (Figure 32)

![Figure 32](image)

Check the front blade position; it will be in the second spot. (Figure 33)

![Figure 33](image)
1.3.a Left/Right

Press the wrench, Technical, Calibration, Collimator Calibration. (Figure 34)

Figure 34

Press **Front Blade** to the right to move it left and left to move it right. (Figure 35)

![Figure 35]

**Figure 35**

Press the check mark to accept the changes.

2 Ball Phantom y-line

Remove the fluorescent screen from the Sensor Head. Attach the alignment ruler between the collimator and the sensor. (Figure 36)

![Figure 36]

**Figure 36**

NOTE: Be careful not to make cuts on the lead blades.
Put the ball phantom into the patient positioning mechanism. (Figure 37)

![Figure 37](image)

**NOTE**: Make sure the unit is off before continuing.

Manually position the C-arm and pin the arm with an alignment pin as shown. (Figure 38)

![Figure 38](image)

Check to make sure that the y-line on the ball phantom and the alignment ruler coincide. (Figure 39)

![Figure 39](image)

### 2.1 Adjusting Y-line

Loosen the three 4mm allen adjustment screws on the patient positioning arm. (Figure 40)

![Figure 40](image)
Slide the patient support table away from or towards the column till aligned. (Figure 41)

Re-tighten the adjustments screws and remove the alignment pin.

3   Ball Phantom x-line

   NOTE   Remove the alignment ruler before turning unit back on.

   Turn the unit on and press the wrench.  (Figure 42)

   Press Technical.  (Figure 43)

   Press Calibration.  (See Figure 43)

   Press Patient support calibration.  (Figure 44)

   Press the left button of the **Turn C-arm**.  (Figure 45)
After the C-arm has finished moving, pin the arm as shown with the alignment pin. (Figure 46)

Check to make sure that the x-line on the ball phantom and the alignment ruler coincide. (Figure 47)

3.1 Adjusting X-line

Use the left or right arrows to adjust the C-arm position till the lines coincide. (Figure 48)

NOTE: Pressing the left button will move the arm forward and pressing the right button will move the arm back.

Remove the alignment pin.

NOTE: If the X-lines are not parallel then adjust the sensor position till it is. See Figure 25 on pg.20.

3.2 Checking Symmetry

On the Patient support calibration window, press Turn C-arm right button once to rotate the C-arm 180° to position 2. (Figure 49)
After the C-arm has finished rotating, pin the arm as shown with the alignment pin. (Figure 50)

![Figure 50](image1.png)

Check to make sure that the x-line on the ball phantom and the alignment ruler coincide. (Figure 51)

![Figure 51](image2.png)

3.2.a More than 1mm deviation

Adjust the sensor position by loosening the three 2.5mm allen screws and adjust the sensor angle by moving it left or right. (Figure 52)

![Figure 52](image3.png)

**NOTE**: Correct the deviation by only half here and half in position 1.

Go back to Beam adjustment, pg.17, if the sensor angle was adjusted and re-check everything again from there.

Press the green check to accept all the changes made to exit the Arm calibration mode.

Remove the alignment ruler and alignment pin.
4 Positioning Lights

NOTE: Make sure the ball phantom is still in the patient positioning mechanism.

4.1 Layer

Press the wrench. (Figure 53)

Carefully adjust the focal layer light to the reference line on the ball phantom with needle nose pliers until it lines up. (Figure 55)

4.1.a Adjusting the light

Once the light is adjusted, press the green check.
4.2 Midsagittal

Touch the touch screen to turn the positioning lights on.

NOTE The midsagittal light must line up with the y-line on the ball phantom

Carefully adjust the light with needle nose pliers until the light lines up. (See Figure 56)

4.3 Frankfort

Put the Frankfort plane alignment tool onto top of the ball phantom. (Figure 57)

NOTE The frankfort plane light must go from the front to back of the tool, range from the top to the bottom, and be straight with the lines on the tool.

4.3.a Adjusting the light

Unscrew the 2.5mm allen screw on the bottom of the column cover and unscrew the adjusting lever for the light. (Figure 58)
Open the column cover. (Figure 59)

Carefully adjust the light with needle nose pliers until the light lines up.
(See Figure 56)
Chapter E

Calibrating the Sensor

1  ProOne setup

NOTE: Make sure that the third person “average adult” is selected and re-attach all c-arm covers.

Press the kV/mA at the main screen. (Figure 60)

![Figure 60]

Set the unit to 64kV and 5mA. (Figure 61)

![Figure 61]

NOTE: The sensor is located between the two gray hash marks on the sensor head cover.

2  Computer setup

Click Start, All Programs, Planmeca, Dimax3 Tool. (Figure 63)

![Figure 63]
Click Settings, Type, ProOne. (Figure 64)

3 Calibration file creation

Click the Panoramic Exposure button. (Figure 65)

When prompted to turn the radiation off, click OK. (Figure 66)

NOTE: The radiation is turned off and on automatically.

Wait until the screen displays Waiting for Exposure. (Figure 67)

Take the exposure. Again there will be a prompt to turn the radiation on, Click OK to continue. (Figure 68)
Wait until the screen displays **Waiting for Exposure**. (Figure 69)

![Figure 69](image)

Take another exposure and remove the calibration block.

The image created should appear like this. (Figure 70)

![Figure 70](image)

Close the Dimax3 Tool.
Chapter F

Beam Check

1 Setting up for Beam check

Press the wrench. (Figure 71)

Press Program, Testing Program, then Beam Check. (Figure 72)

On the computer, open Internet Explorer and in the address field put the IP address of the unit. (Figure 73)

2 Adult Collimation

Make sure collimation is set for Adult. If not press the up/down button to cycle to Adult. (Figure 74)

Take the exposure.

On the computer, press Refresh to get the image.
The image should look like this. (Figure 75)

NOTE: The image is inverse, beam is white instead of black.

If the beam is off go to pg. 15 and adjust the beam.

3 Child Collimation

Make sure collimation is set for Child. If not press the up/down button to cycle to Child. (Figure 76)

![Figure 76](image)

Take the exposure.

On the computer, press Refresh to get the image.

The beam should look like this. (Figure 77)

![Figure 77](image)

If the beam is off go to pg. 15 and adjust the beam.

4 Patient Support Check

NOTE: Make sure the collimation is set to Adult.

Press Go in the Drive c-arm to y position. (Figure 78)
Put ball phantom into patient support. (Figure 79)

Figure 79

Take an exposure.

On the computer, press Refresh to get the image.

The images should look like this. (Figure 80)

Figure 80

If the image does, move onto Ball phantom test pg.235.
Chapter G

Ball Phantom Test

1 Romexis

Click on Start, All Programs, Planmeca, Romexis.

NOTE Place the ball phantom into the patient positioning mechanism.

2 Ball Phantom Test

Click on Find and then double click the Test patient. (Figure 81)

Click on Imaging on the left. (Figure 82)

Click on Pan at the top. (Figure 83)

Press Ready on the touch screen and take an exposure.

Click Done on the computer screen to evaluate the image for alignment. (Figure 84)

2.1 Measurement Tool Calibration

Click on the CAL icon, and calibrate the Center Ball from top to bottom. (Figure 85)

NOTE To create a line, left click to start the line and right click to complete the measurement.
Enter the number 7 when asked to input a distance. (Figure 86)

3 Measuring Image

Click the icon below CAL and measure the top to bottom and left to right. (Figure 87)

The ball should be 7mm top to bottom and left to right. (Figure 88)

3.1 Adjusting the Center Ball

If the center ball is too fat, move the mm to the right. (Figure 89)

If the center ball is too skinny, move the mm to the left.

Measure from the center of the Center Ball to the center on the 10th Ball on the right then measure from the center of the Center Ball to the center of 10th Ball on the left.

NOTE: To be able to measure to the tenth ball, make sure that the image is zoomed in as much as possible. Click on show overview. Use the over screen to move to the tenth balls. (Figure 90)

The 10th ball needs to be +/-2mm.
3.2 Adjusting the 10\textsuperscript{th} ball

If the distance is greater than 2mm on the patient left, move the patient support table away from the column.

Loosen the three 3mm allen screws on the bottom of the support table away from the column. (Figure 91)

If the distance is greater than 2mm on the patient right, move the patient support table towards the column.

Loosen the three 3mm allen screws on the bottom of the support table and move towards the column. (See Figure 91)

Now check the shadow ball by clicking the Vertical Line from point icon from the measurement toolbar. (Figure 92)

Click the top of the shadow ball and measure the distance between the shadow ball to the Center Ball. (Figure 93)
3.3 Adjusting the Shadow Ball

If the distance between the center ball to the shadow ball is greater than 1.5mm on the patient left, rotate the patient support table away from the column.

Loosen the two outside 3mm allen screws on the bottom of the patient support table. (Figure 94)

Figure 94

If the distance between the center ball to the shadow ball is greater than 1.5mm on the patient right, rotate the patient support table towards from the column.

Loosen the two outside 3mm allen screws on the bottom of the patient support table. (See Figure 94)
Setting up an Ethernet ProSensor

I. System Components

II. Laptop/Computer Layout

NOTE: The cables between the PoE to the Control box and computer are **Straight** CAT-5 cables.
III. Network Layout

NOTE: The cables between the PoE to the Control box and computer are straight CAT-5 cables.

IV. Computer Setup

Open Internet Explorer, click on Tools and then Internet Options (Figure 3)
Click on Connections then LAN Settings. (Figure 4)

Uncheck Use a proxy server for your LAN. (Figure 5)

NOTE: Make sure that the computer is on the same ip scheme as the Control Box. The default ip for the Control Box is 172.26.150.150.
A. Didapi Configuration

NOTE: The Didapi kit must be 4.6.1 or later.

1. Image Preprocessing

2. Ethernet Interface

NOTE: Config file should read: localhost=(ip address of the sensor). There is also no port number for the ProSensor.

V. Changing Control Box IP

Open Internet Explorer and put 172.26.150.150/index.html into the address field. (Figure 6)

Click on Change IP address. (See Figure 6)
The IP address, Subnet Mask, and Gateway can be changed to the necessary settings. Click send to set the new changes. (Figure 7)

<table>
<thead>
<tr>
<th>TCP/IP:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address: 255.255.255.255</td>
</tr>
<tr>
<td>Subnet Mask: 255.255.255.255</td>
</tr>
<tr>
<td>Default Gateway: 255.255.255.255</td>
</tr>
</tbody>
</table>

Figure 7

NOTE: The indicator on the Control Box will go from Yellow to Blue. After it goes blue, power cycle the Control box. (Figure 8)

VI. Updating Control Box Software

NOTE: This is for update from 1.0.0 software or higher.

Open Internet Explorer and put 172.26.150.150/upload.asp into the address field. (Figure 9)

NOTE: The IP address above is the default IP and needs to be changed if the Control Box IP has been changed.

Figure 9

Click on Browse to select the update file. (See Figure 9)

Click send to update the software. (See Figure 9)
NOTE: The indicator on the Control Box will go from Yellow to Blue. After it goes blue, power cycle the Control box. (Figure 10)

A. Resetting the Control Box IP

NOTE: Make sure the power cable is plugged in before resetting the Control Box.

Press the sides of the Control Box to detach the bottom cover. (Figure 11)

Use a 1.5mm allen to press in on the reset button. (Figure 12) The indicator on the box will flash Yellow then go to solid Green then go to solid Blue.

After the indicator is solid Blue, take the allen out and power cycle the Control Box.
VII. Control Box Light Indicators

<table>
<thead>
<tr>
<th>Light Indication</th>
<th>Status Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>ProSensor power is unplugged</td>
</tr>
<tr>
<td>Dim Blue</td>
<td>ProSensor is connected but off</td>
</tr>
<tr>
<td>Bright Blue</td>
<td>ProSensor is on</td>
</tr>
<tr>
<td>Flashing Slowly Blue</td>
<td>Waiting for Ready</td>
</tr>
<tr>
<td>Steady (Solid) Green</td>
<td>Waiting for Exposure</td>
</tr>
<tr>
<td>Flashing Rapidly Green</td>
<td>Exposure is taken and image is transferring</td>
</tr>
<tr>
<td>Steady (Solid) Red</td>
<td>An error has occurred</td>
</tr>
<tr>
<td>Flashing Slowly Yellow</td>
<td>Unit is in service mode</td>
</tr>
</tbody>
</table>

Quick Installation Guide for ProSensor Ethernet

1. Install DIDAPI kit 4.6.8 or later

2. Change your computer’s IP address to 172.26.150.100.


4. Change ProSensor Control Box IP address as needed.

   Reboot the Control Box after every (IP, FPGA, or SW) update. Reboot the Control Box by unplugging and plugging the Ethernet cable.

5. Add Calibration files to folder: (location of the Didapi.dll file)
   2. C:\Program Files\Planmeca\Dimaxis\Program

   NOTE: There are 3 files for each sensor. e.g. 137430.cal, 137430.dark, 137430.meta.cal

6. Open Didapi Configuration
   a. Select the Ethernet Interface tab.
      * Browse the file path to the folder where your Planmeca files are located (e.g. C:\Program Files\Planmeca\Dimaxis\Program). Click APPLY.
      * Select Planmeca ProSensor for the X-ray Sensor Type and enter the IP address of the ProSensor control box: 172.26.150.150 (default IP shown) and Network name unknown. Click APPLY.
   b. Select the Common tab
      * Browse the file path to the folder where your Planmeca calibration files are located (e.g. C:\Program Files\Planmeca\Dimaxis\Program). Click APPLY.
Quick Installation Guide for ProSensor USB

1. Install DIDAPI kit 4.6.8 or later
   • Make sure to choose Didapi and device drivers and ProSensor USB Driver.
   • Click NEXT and browse to the folder path: C:\Program Files\Planmeca\Dimaxis\Program
   • Click NEXT to start the Device Driver Installation Wizard
   • Click NEXT and prosensor_enum and prosensor_driver are shown on the list then click FINISH.

2. Attach the ProSensor USB to the PC, =>
   • Device Driver Installation Wizard open, finish that installation
   • Device Driver Installation Wizard opens again, finish this installation

3. Go to Network Connection
   • Right click on Planmeca Prosensor, click on Properties then Internet Protocol (TCP/IP) Properties
   • Click on Use the following IP address and type in 10.100.100.131 / 255.255.255.0

4. Add Calibration files to folder: (location of the Didapi.dll file)
   3. C:\Program Files\Planmeca\Dimaxis\Program

   NOTE: There are 3 files for each sensor. e.g. 137430.cal, 137430.dark, 137430meta.cal

5. Open Didapi Configuration
   c. Select the Ethernet Interface tab.
      • Browse the file path to the folder where your Planmeca files are located (e.g. C:\Program Files\Planmeca\Dimaxis\Program). Click APPLY.
      • Select Planmeca ProSensor for the X-ray Sensor Type and enter the IP address of the ProSensor control box: 10.100.100.130 (default IP shown) and Network name unknown. Click APPLY.
   d. Select the Common tab
      • Browse the file path to the folder where your Planmeca calibration files are located (e.g. C:\Program Files\Planmeca\Dimaxis\Program). Click APPLY.
**2D COMPUTER SPECS**

**Planmeca**

- 19" color monitor
- CPU: Intel Core i5 or equivalent
- RAM: 4 GB or higher
- Hard drive: 500 GB or higher
- Operating system: Windows 7 or higher

**Digital X-Ray Software**

- Image capture workstation
- Support for 64-bit OS
- No need for network connection to be enabled
- Digital X-Ray View and ViewStation
- For planning, imaging, and diagnostic

**Notes**

- Directly into your network
- Ethernet ready
- USB mouse or keyboard
- Digital X-Ray View and ViewStation
- For planning, imaging, and diagnostic

**Additional Specifications**

- Monitor: 19" color
- CPU: Intel Core i5 or equivalent
- RAM: 4 GB or higher
- Hard drive: 500 GB or higher
- Operating system: Windows 7 or higher

**Image Capture Workstation (2D)**

- Support for 64-bit OS
- No need for network connection to be enabled
- Digital X-Ray View and ViewStation
- For planning, imaging, and diagnostic

**CPU specifications**

- Intel Core i5 or equivalent
- RAM: 4 GB or higher
- Hard drive: 500 GB or higher
- Operating system: Windows 7 or higher
Romexis User Login Setup

Configure Username and Password Requirement

I. Romexis Configuration program (found only on server)
   A. Go to Start > All Programs > Planmeca > Romexis Configuration.

      Note: The Romexis administrator account is: Username = sysadm, Password = promax.

   B. Click Security under the Resources folder.
   C. Select the Username and Password are required option.
   D. Uncheck the Login only with Swipe Card option.
   E. Click the OK button.
Create Romexis Groups (Security Groups)

I. Romexis > Admin module
   A. Launch the Romexis program.
      
      Note: The Romexis administrator account is: Username = sysadm, Password = promax.

   B. Click the Admin button on the lower left of the screen.
   C. The Resource and Groups tabs should be selected.
   D. Click the Add button.
E. Type a Group Name.
F. Type a Description.
G. Add the required permissions from the Available list to the Current list.
   1. Available permissions include possible permissions that have not yet been assigned.
   2. Current permissions are the assigned permissions.
H. Click the OK button.

Please see the next page for this example’s permissions.
Example permissions shown:

<table>
<thead>
<tr>
<th>Admin</th>
<th>Reporting</th>
<th>Patient Mgmt</th>
<th>Patient Queries</th>
<th>Clinic Mgmt</th>
<th>Clinical Info</th>
<th>Imaging</th>
<th>Deny Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>View reports</td>
<td>Add patients</td>
<td>View DICOM Worklist</td>
<td>NA</td>
<td>View clinical info</td>
<td>Manage templates</td>
<td>System Admin</td>
</tr>
<tr>
<td>Config reports</td>
<td>View patients</td>
<td>View DICOM Q/R</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update patients</td>
<td>View Find by Image</td>
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<tr>
<td>Inactivate patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capture X-Rays w/o approval</td>
<td>System Admin</td>
<td></td>
</tr>
<tr>
<td>View all patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Import images</td>
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<td>Update all patients</td>
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<td>Export images</td>
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<td>Print demo</td>
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<td>Inactivate images</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Move images to another patient</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Create Romexis Users

I. Romexis > Admin module
   A. Launch the Romexis program.

   Note: The Romexis administrator account is: Username = sysadm, Password = promax.

   B. Click the Admin button on the lower left of the screen.
   C. Under the Resource tab, click the Users tab.
   D. Click the Add button.
E. Type the new account’s information:
   1. Username
   2. Password
   3. Retype Password

F. Under Member of Groups, check the group membership.

G. Under Roles, check the User is a provider box and select the provider type.

H. The Person ID is not required.
I. Type the user account’s First Name.
J. Type the user account’s Last Name.
K. Click the OK button.
Romexis DICOM Setup: Storage & Worklist

The document is valid for Romexis version 2.1.1.R.

I. **Configure DICOM Storage**
   A. Launch the Romexis program.
   B. Click the Admin module.
   C. Click the Imaging tab.
   D. Click the DICOM tab.
E. Click the **Select** button for the Default Storage AE.
F. Click the **Add** button for a new Storage AE entry.

G. Enter the DICOM Storage information.
   1. AE Title
   2. Host Name (IP Address)
   3. Port Number

H. Click the **OK** button after entering the information.
I. Click the **OK** button on the Default Storage AE window.
J. Click the Setup button for the Default Storage AE.
K. Select the required features.
L. Click the OK button.
M. Click the Save button.

Note: The global DICOM Storage entry has now been configured.

N. Do not restart Romexis yet if DICOM Worklist needs to be configured.
O. Click the Local Settings tab.

P. Enter this workstation’s DICOM information
   1. AE Title for this workstation (workstation’s unique identifier)
   2. Station Name
   3. Institution Name
   4. Institution Department Name

Q. Click the Save button.

R. Restart the Romexis program as prompted.
II. Configure DICOM Worklist
   A. Launch the Romexis program.
   B. Click the Admin module.
   C. Click the Imaging tab.
   D. Click the DIOM tab.
   E. Click the Select button for the Default Worklist AE.
   F. Click the Add button.
G. Enter the DICOM Worklist information.
   1. AE Title
   2. Host Name (IP Address)
   3. Port Number
H. Click the **OK** button after entering the information.
I. Click the **OK** button on the Default Worklist AE window.
J. Click the **Save** button.

Note: If the workstation’s DICOM AE title has not been configured, go to previous Heading 1, Section O (Page 233).

K. Restart the Romexis program as prompted.
Romexis Configuration Setup

This document is valid for Romexis version 2.1.1.R.

Romexis Configuration

I. Romexis Configuration program (found only on server)
   A. Go to Start > All Programs > Planmeca > Romexis Configuration.
   B. Type the default administrator account login.
      1. Username = sysadm
      2. Password = promax

II. General Settings
    A. Select Show Username in Client’s title bar.
    B. Uncheck Allow more than one client instance on one workstation.

Note: Instance Name refers to the SQL database Instance Name. Romexis is the default Instance Name.

III. Person Settings
    A. Select the below settings.
    B. Refer to the Romexis User Manual for further detail.
IV. Security Settings
   A. Click Security under the Resources folder.
   B. Set the Login Username and Password settings (defaults shown).

Note: Refer to the Romexis User Login setup instruction guide for custom user logins.

V. Regional Settings
   A. Set the Tooth Identification System setting as needed.
   B. Set the Country to “United States”.
VI. Panoramic Settings
   A. Set the Resolution as follows:
      1. ProMax or Proline XC = Enhanced
      2. ProOne = Normal
   B. Change the Image Format as needed.

Note: Refer to the Romexis User Manual; Section 1.5 Archiving for more detail.

VII. Cephalometric Settings
   A. Leave the default Resolution setting at Normal.
   B. Change the Image Format as needed.

Note: Refer to the Romexis User Manual; Section 1.5 Archiving for more detail.
VIII. Intraoral Settings
A. Leave the default Resolution setting at Normal.
B. Change the Image Format as needed.

Note: Refer to the Romexis User Manual; Section 1.5 Archiving for more detail.

IX. Print Settings
A. Click the Browse button next to the Logo type to add the logo file.
B. Select the logos to show on the printouts.
C. See the below sample print layout. Logo positions can be changed in the Romexis program.
Romexis Template Setup: 18 FMX & 4 BWX

The document is valid for Romexis version 2.1.1.R.

I. Templates Editor
   A. Launch the Romexis program.
   B. Click the Admin module.
   C. Click the Imaging tab.
   D. Click the Templates tab.

II. Create an 18 FMX Template
   A. Click the New button found at the bottom of the Romexis window.
   B. Type the name of the new template, and click the OK button.
C. Choose the following layout values.

D. Click the top Custom button.

E. Remove the three middle image holders by double-clicking each holder to show the placeholder properties.
F. Check the Void box for each image holder.
G. Click the OK button.
H. Repeat for the remaining two image holders.

I. Double-click the remaining 18 image holders to set their properties. See the chart and sample below for suggested settings.

<table>
<thead>
<tr>
<th>Exposure Order #</th>
<th>Tooth # (ADA)</th>
<th>Sensor Orientation Dot (SOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1, 2, 3</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>2</td>
<td>3, 4, 5</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>3</td>
<td>17, 18, 19</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>4</td>
<td>19, 20, 21</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>5</td>
<td>14, 15, 16</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>6</td>
<td>12, 13, 14</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>7</td>
<td>30, 31, 32</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>8</td>
<td>28, 29, 30</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>9</td>
<td>4, 5, 6</td>
<td>SOD to <strong>Bottom</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Bottom</strong></td>
</tr>
<tr>
<td>10</td>
<td>7, 8, 9, 10</td>
<td>SOD to <strong>Bottom</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Bottom</strong></td>
</tr>
<tr>
<td>11</td>
<td>11, 12, 13</td>
<td>SOD to <strong>Bottom</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Bottom</strong></td>
</tr>
<tr>
<td>12</td>
<td>26, 27, 28</td>
<td>SOD to <strong>Top</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Top</strong></td>
</tr>
<tr>
<td>13</td>
<td>23, 24, 25, 26</td>
<td>SOD to <strong>Top</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Top</strong></td>
</tr>
<tr>
<td>14</td>
<td>21, 22, 23</td>
<td>SOD to <strong>Top</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Top</strong></td>
</tr>
<tr>
<td>15</td>
<td>1, 2, 3, 32, 31, 30</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>16</td>
<td>3, 4, 5, 30, 29, 28</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>17</td>
<td>14, 15, 16, 19, 18, 17</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>18</td>
<td>12, 13, 14, 21, 20, 19</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
</tbody>
</table>
III. Create an 4 BWX Template
A. Click the New button found at the bottom of the Romexis window.
B. Type the name of the new template, and click the OK button.
C. Choose the following layout values.

D. Click the top Custom button.

E. Double-click each image holder to set their properties. See the chart and sample below for suggested settings.

<table>
<thead>
<tr>
<th>Exposure Order #</th>
<th>Tooth # (ADA)</th>
<th>Sensor Orientation Dot (SOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1, 2, 3, 32, 31, 30</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>2</td>
<td>3, 4, 5, 30, 29, 28</td>
<td>SOD to <strong>Right</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>3</td>
<td>14, 15, 16, 19, 18, 17</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
<tr>
<td>4</td>
<td>12, 13, 14, 21, 20, 19</td>
<td>SOD to <strong>Left</strong>, Alignment X = <strong>Center</strong>, Alignment Y = <strong>Center</strong></td>
</tr>
</tbody>
</table>
Integration Procedures for TWAIN

NOTE: These procedures are recommended.

I. Didapi Drivers

A. Installation

1. Put the Didapi Drivers disk inside of the CD drive.
2. Follow the on screen instructions.
3. When asked what components to install, click all options.
4. When asked where to install the drivers, it needs to be installed to the Dimaxis Program folder.
5. Restart the computer when prompted.
B. Didapi Configuration

1. Click on Start, All Programs, Planmeca, Didapi Configuration

2. Click on the Image Preprocessing tab.

2.1 ProOne

Under Dimax 2 and Dimax 3 Panoramic settings it should be set to what is shown below.

2.2 ProMax/Proline XC

Under Dimax 2 and Dimax 3 Settings it should be set to what is shown below.

2.2.a Pan

2.2.b Ceph

II. Didapiui.ini

Click on Start, Run, didapiui.ini

Change the [DIMAX2_P] section to have these parts as shown below.

Resolution=Normal
MedianFilterEnabled=1
SharpeningEnabled=0
Integration Procedures for Eaglesoft

NOTE: These procedures are recommended.

I. Didapi Drivers

A. Installation

1. Install the Planmeca Supplement.
2. Put the Didapi Drivers disk inside of the CD drive.
3. Follow the on screen instructions.
4. When asked where to install the drivers, it needs to be installed to the Eaglesoft Shared Files folder.
5. Restart the computer.

B. Didapi Configuration

1. Click on Start, All Programs, Planmeca, Didapi Configuration
2. Click on the Image Preprocessing tab.

2.1 ProOne

Under Dimax 2 and Dimax 3 Panoramic settings it should be set to what is shown below.

2.2 ProMax/Proline XC

Under Dimax 2 and Dimax 3 Settings it should be set to what is shown below.

2.2.a Pan

2.2.b Ceph

II. Eaglesoft

A. Planmeca Pan/Ceph Settings

Under Planmeca Pan/Ceph Settings it should be set to what is shown below.
Mac Drivers Installation

Insert the **Planmeca Mac Drivers** Disk into the Mac. (Figure 1)

Figure 1

Double click on the **PM_DRIVERS_MAC 2** disk on the desktop. (Figure 2)

Figure 2

Double click on **DIDAPIKIT**. (Figure 3)

Figure 3

Follow the on screen instructions. (Figure 4)

Figure 4

**NOTE:** There is a prompt for the password for the Mac to install software. The office should have this password. (Figure 5)
Once the drivers are installed, go to the Macintosh HD, Library, Preferences, Didapi. (Figure 6)

NOTE: The drivers automatically install the ethernet configuration files

Setup the appropriate Ethernet Configuration file for the unit that the office has.

NOTE: The Ethernet Configuration file for a ProOne may have the improper IP Port which needs to be 5005. (Figure 7)

Make sure that all the other configuration files for the units not connecting to have a pound sign, #, before localhost=(ip address):IP port.

Copy all of the calibration files for the unit into the Didapi folder. (Figure 8)

NOTE: The office will still need access to at least a windows parallel, or a PC machine that can be hooked up to the X-Ray as the calibration tools (Dimax3 tool) are not Mac compatible.

For any further Planmeca Technical Support, contact Frank Ilcken or Vlad Kovalov at (630)-529-2300 or email them directly frank.ilcken@planmecausa.com or vlad@planmecausa.com.
System Error 11003 Troubleshooting

1. Open My Computer
2. Open local hard drive c: or whatever your C drive is called.
3. Open solid
4. Open the solid.ini file
   a. might be called “solid” with the file type of Configuration Settings
5. Page down to the bottom of the Filespec lines and copy the last line.
   a. Each line is an additional 2GB of space

```
Filespec_10=c:solid\database\solid10.db 2000m
Filespec_11=c:solid\database\solid11.db 2000m
Filespec_12=c:solid\database\solid12.db 2000m
Filespec_13=c:solid\database\solid13.db 2000m
Filespec_14=c:solid\database\solid14.db 2000m
Filespec_15=c:solid\database\solid15.db 2000m
Filespec_16=c:solid\database\solid16.db 2000m
```

6. In a new line paste as many new lines needed to increase the database.
7. Change the new “Filespec” lines so that the each filespec increases
8. Change the end of every new “Filespec” line so that the solid(number) matches the number at the beginning of the line.
9. After all the lines are added, Save and close the file.
10. Restart the Solid service.
    a. After restarting the service, the database has been increased.

Part 2: Starting and Stopping the Solid service

1. Open Control Panel
2. Open Administrative Tools
3. Open Services
4. Go to SOLID FE and stop the service.
5. Count to 10 then restart the service.
# DIDAPI ERROR CODES

<table>
<thead>
<tr>
<th>DIDAPI Error</th>
<th>Definition</th>
<th>Tech Brief</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIDAPI 1</td>
<td>Everything OK</td>
<td>Rare error but not harmful</td>
</tr>
<tr>
<td>DIDAPI 2</td>
<td>No communication between PC and X-ray</td>
<td>Could be anything. Just have to troubleshoot.</td>
</tr>
<tr>
<td>DIDAPI 3</td>
<td>Cannot initialize capture (Treat the same as DIDAPI 2)</td>
<td>Usually driver or DLL related but treat just like a DIDAPI 2</td>
</tr>
<tr>
<td>DIDAPI 4</td>
<td>OS Error</td>
<td>Rare. Check DLL versions or Re-install software.</td>
</tr>
<tr>
<td>DIDAPI 5</td>
<td>Grabbing timed out</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 6</td>
<td>Image transfer error</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 7</td>
<td>Grabbing not ready</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 8</td>
<td>Image Grabbing is busy</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 9</td>
<td>Image grabbing done</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 10</td>
<td>Bad Index Parameter</td>
<td>DIDapi log messages</td>
</tr>
<tr>
<td>DIDAPI 100</td>
<td>Bad parameter Operation</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 12</td>
<td>ROI is out of bounds</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 14</td>
<td>Sensor is not calibrated</td>
<td>Shoot the calibration file</td>
</tr>
<tr>
<td>DIDAPI 15</td>
<td>Calibration Failure</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 16</td>
<td>File is not open</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 17</td>
<td>File write failure</td>
<td>Check the permissions for the user profile</td>
</tr>
<tr>
<td>DIDAPI 18</td>
<td>Hardware is not present</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 19</td>
<td>Bad mode</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 20</td>
<td>Bad program</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 21</td>
<td>Image is unfinished</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 22</td>
<td>Out of memory</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 23</td>
<td>Missing temporary directory</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 24</td>
<td>No Image Data</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 25</td>
<td>Cal file is in the wrong format</td>
<td>Need new naming convention for the cal file. Shoot a new cal file</td>
</tr>
<tr>
<td>DIDAPI 26</td>
<td>Incorrect password</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 27</td>
<td>Pan sensor not connected</td>
<td>Check the sensor connection and cables</td>
</tr>
<tr>
<td>DIDAPI 28</td>
<td>Ceph sensor not connected</td>
<td>Check sensor connection and cables</td>
</tr>
<tr>
<td>DIDAPI 29</td>
<td>X-ray is busy</td>
<td></td>
</tr>
<tr>
<td>DIDAPI 30</td>
<td>PC communication is disabled</td>
<td>Uncheck the disable pc communication under the special operations mode selection</td>
</tr>
<tr>
<td>DIDAPI 31</td>
<td>Unable to resolve host name</td>
<td>Check configuration text file. Make sure it says &quot;localhost=&quot;</td>
</tr>
<tr>
<td>DIDAPI 32</td>
<td>Unable to make TCP connection</td>
<td>Check network connection and configuration text files. Unplug Nib power and plug back in</td>
</tr>
<tr>
<td>DIDAPI 33</td>
<td>Connection to the sensor may be bad</td>
<td>Could be sensor, sensor holder, cat5 cable, planet cable, dongle, or Keyboard Processor</td>
</tr>
</tbody>
</table>
Troubleshooting ODBC Communication Error

**SERVER**
- Shmem Solid
  - Running EXE or Service?
    - If solid is not on task bar, start solid database.
      - No
        - Go to Server.
          - Make sure service is started. If not started, set service to autostart.
            - Make changes and restart database.
        - Yes
          - System DSN and Dimaxis.ini both =shmem solid?
            - No
              - Run database setup in Dimaxis. Database must be running.
            - Yes
              - Done

  - Service
    - Able to log on?
      - No
        - Make changes and restart database.
      - Yes
        - Done

**ERROR**
- Start-Run-Dimaxis.ini. DSN=?
  - No
    - Network tab is Solid Remote/ PM Remote Control set to listen for TCPIP 1313 in the solid.ini file
      - Make changes, restart the database and try logging in again.
    - Can other clients log on?
      - No
        - Check licensing and firewall
          - Yes
            - Network Cable plugged in?
              - No
                - Make changes and try logging on.
              - Yes
                - Able to log on?
                  - No
                    - Done
                  - Yes
                    - Contact network administrator
    - Able to Ping Server?
      - No
        - Network Cable plugged in?
          - Yes
            - Able to log on?
              - No
                - Make changes and try logging on.
              - Yes
                - Done
          - No
            - Contact network administrator
      - Yes
        - Able to log on?
          - No
            - Done
          - Yes
            - Contact network administrator

**CLIENT**
- TCPIP 192.x.x.x 1313
  - Dimaxis.ini and System DSNmatch?
    - No
      - Make changes and try logging on.
    - Yes
      - Able to log on?
        - No
          - Contact network administrator
        - Yes
          - Done
## Digital ProMax Compatibility Chart

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.16.7 Non-Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>PCI</td>
<td>3.2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.16.7 Non-Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.19.7 Color &amp; Non-Color GUI</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Ethernet</td>
<td>4.1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTICE: In select cases, there could be a change in diagnostic quality of the image.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.21.1 Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.3.3</td>
<td>1.5.0</td>
<td>1.4.0</td>
<td>1.5.0</td>
</tr>
<tr>
<td>1.21.4 Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.21.7 Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Ethernet/3D</td>
<td>4.3.3+</td>
<td>1.8.1</td>
<td>1.7.1</td>
<td>1.8.1</td>
</tr>
<tr>
<td>1.30.4 and Color GUI</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.6.4</td>
<td>2.3.0</td>
<td>2.3.0</td>
<td>2.3.0</td>
</tr>
</tbody>
</table>

**KEY:**
- X = supported
- = unsupported
- PCI = 2D Digital
- Ethernet = 2D Digital
- 3D = 3D Digital
DxLoader (DxExport.exe): Export Dimaxis data to Romexis

I. Dimaxis Pro Pre-Export Setup

A. Solid Database Tables

1. If SOLID is below SOLID 4.1, it needs to be updated to Solid 4.1 with Dimaxis 4.5.0.

NOTE: The Dimaxis 4.5.0 disk needs to be available to update the SOLID Database tables.

a) Click on Start, All Programs, Solid Flow Engine, PM Sql Editor (Figure 1)

![Figure 1](image)

b) Click on File, Open, Dimaxis 4.5.0 CD, Solid, serverpr, sql

NOTE: The database must be upgraded step by step as shown in the grid below. (Figure 2)

![Figure 2](image)

c) Click on SQL with the arrow above it.

![Figure 3](image)

d) Fill in the fields in the login prompts as shown below.

NOTE: The password is dixi. (Figure 4)

![Figure 4](image)

The programs will execute the script, then when it is finished Query Ready appears in the left corner.

If more scripts need to be run, repeat part b.
2. If SOLID is 4.1.4, the Solid Tables need to be updated.
   a) Click on Start, All Programs, Solid Flow Engine, PM Sql Editor (Figure 5)

   Figure 5

   b) Input the following: (figure 6)

   ```sql
   alter table IA_STUDY_TEMPLATE add column TSTATUS SMALLINT;
   commit work;
   ```

   Figure 6

   c) Click on SQL with the arrow above it. (Figure 7)

   Figure 7

   d) Fill in the fields in the login prompts as shown below.

   NOTE: The password is dixi. (Figure 8)

   Figure 8

B. Patient Name Case

1. Find the patient name case used in Romexis.

2. Run the Name Converter program to set the patient name case in Dimaxis, so the case matches that of Romexis.

3. To run Name Converter, go to Start > All Programs > Planmeca > NameConverter. (Figure 9)
   a) Capitalize = (John Doe)
   b) Change to upper case = (JOHN DOE)
C. Date of Birth Format

1. Find the Date of Birth format used in Romexis.
2. In Dimaxis, set the Birth date setting as needed to match Romexis.
   a) Click on Administration, Global Settings, Patient

Note: The below example results in MM/DD/YYYY for Dimaxis. (Figure 10)

D. Dimaxis Templates Print Positions

1. All Dimaxis study templates must have a print position for the images to export in template form to Romexis.
2. In Dimaxis, select Edit Template from the Study menu.
3. Double-click the first template in the list.
4. Double-click a holder.
5. Verify all holders have a position on the Print Position grid. The total holders need to equal the number of gray/black squares in the Print Position grid.
6. If not, set a position for the missing holder.

II. Required Software

A. On the CBVT DVD, copy the [drive_root]\Romexis\Tools\DxLoader folder to [drive_root]\Program Files\Planmeca\Romexis\Tools. The folder contains:
   1. DxExport.exe
   2. RomexisDxLoader.jar
   3. ImageArc.dll (version 4.5.0)
   4. DxExport.ini

B. Rename the ImageArc.dll in:
   [drive_root]\Program Files\Planmeca\Dimaxis\Program
1. Copy the ImageArc.dll to the folder.
2. After running the DxExport.exe, replace the new ImageArc.dll file with the original file.

   NOTE: Dimaxis may not run if the imagearc.dll is incompatible.

C. Copy the DxExport.ini to C:\Windows.

Run the DxLoader (DxExport.exe) program
D. Double-click the DxExport.exe file.
E. See below for an example of typical settings used.
F. Click the Start button to begin the migration/export process.
G. Click the Done/Exit button after the process completes.
## Calibration Settings

### Proline:

<table>
<thead>
<tr>
<th></th>
<th>Binning</th>
<th>4x4</th>
<th>3x3</th>
<th>2x2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V</strong></td>
<td>Pan Dimax2 with cal block</td>
<td>60/4</td>
<td>60/6</td>
<td>60/10</td>
</tr>
<tr>
<td><strong>R</strong></td>
<td>Ceph Dimax2</td>
<td>60/4</td>
<td>60/7</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>Pan Dimax3 v1 with cal block</td>
<td>66/4</td>
<td>70/6</td>
<td>70/12</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Ceph Dimax3 v1</td>
<td>60/6</td>
<td>60/11</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>O</strong></td>
<td>Pan Dimax3 v2 with cal block: (S/N 437003 or Later)</td>
<td>60/4</td>
<td>66/4</td>
<td>70/6</td>
</tr>
<tr>
<td></td>
<td>Ceph Dimax3 v2 with cal block: (S/N 437003 or Later)</td>
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<td>60/6</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### ProMax:

<table>
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<th>3x3</th>
<th>2x2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V</strong></td>
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<td>70/8</td>
<td>70/14</td>
<td>70/16</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Ceph Dimax2 Normal Speed</td>
<td>60/14</td>
<td>60/16</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>R</strong></td>
<td>Ceph Dimax2 High Speed</td>
<td>70/16</td>
<td>70/16</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>Pan Dimax3 v1 w/o cal block</td>
<td>60/1</td>
<td>60/2</td>
<td>60/4</td>
</tr>
<tr>
<td><strong>I</strong></td>
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<td>60/13</td>
<td>n/a</td>
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<tr>
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<td>70/16</td>
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<td><strong>N</strong></td>
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<tr>
<td></td>
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<td>70/9</td>
<td>n/a</td>
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</tbody>
</table>