SOPRO Intraoral Cameras

Information on
“How do you select an intraoral camera?”
&
“Why SOPRO cameras are the right choice?”
September 2015
How do you select an Intraoral camera?

The selection of an intraoral camera for use in a dental practice is difficult because of the large number of units in the marketplace and the widely varying features, price and capabilities of each. In order to assist the decision process, the following criteria should be considered in making this important decision:

<table>
<thead>
<tr>
<th>1. Ease-of-use:</th>
<th>2. Ergonomics:</th>
<th>3. Image quality:</th>
</tr>
</thead>
</table>
| ‣ Ease of intraoral access  
 ‣ Ease of focus (fixed)  
 ‣ Auto "on/off" switch  
 ‣ Minimal handpiece manipulation required | ‣ The camera handpiece must be compact, light and portable. | ‣ The image quality must be crisp, clear and able to show proper color of both hard & soft tissue. |

|----------------|-------------------|-----------|
| ‣ The camera must feature “usable” technology that interfaces with industry standards and provides a platform for expansion. | ‣ The camera should feature a large depth of field for capturing a variety of intraoral images. | ‣ A camera with a fixed focus will offer ease of use.  
 ‣ A camera should require little or no manual adjustment to produce a focused image. |

|------------------|------------------|------------|
| ‣ The camera should feature a variable lens setting to provide the end-user with different magnification options for optimum display and better diagnostic capabilities. | ‣ The camera must offer digital and analog options to integrate into any operatory.  
 ‣ The camera must offer a TWAIN interface to be functional with the industry’s increasing number of Practice Management Software. | ‣ The manufacturer must be technically proficient, offer reliable service and execute prompt “turn around” on all repairs.  
 ‣ The camera must be easy to service and all associated repair parts and service must be reasonably priced. |

1. **Ease of use**

An intraoral camera should be viewed as a dental instrument that can be utilized to improve overall diagnosis and treatment. This instrument will increase office revenue by allowing the dental clinician to better communicate recommended procedures to the patient. If the camera is easy to use, the practitioner can “streamline” his/her time with the patient since the camera-generated images speak for themselves. They will also provide improved information for the patient and increase the overall productivity of the office. The additional time required to use an intraoral camera on a patient should never exceed five minutes and if it does, it is likely that the camera chosen does not meet one or more of the criteria shown above.

2. **Ergonomic in design**

Good ergonomic design is critical to the day-to-day functions of a dental practice. With numerous complex procedures involving multiple pieces of equipment (used for diagnosis, communication, management, etc.) a common problem often faced by dentists is not having enough room for all the necessary equipment used in the dental operatory. Since the positioning of all dental equipment is important, having an intraoral camera system that is small, compact and space-conscious is critical to the selection process. Additionally, the camera and the docking station must offer the flexibility to be either wall-mounted or integrated into a dental delivery unit. This allows it to be easily accessible to the end user and not take up any valuable counter space. This type of compact design will provide a better working environment for the dental clinician and will also reduce the risk of product failure (caused from dropping the camera or docking station, rolling over a camera cable, accidentally spraying the intraoral camera system while cleaning the operatory, etc.).
3. **Image quality**

It is crucial that an intraoral camera provide the best quality image possible. When the patient can see exactly what the dentist sees, it builds patient understanding, trust and motivation to agree to the indicated treatment plan. If the camera produces an image with poor quality, it could jeopardize the message being communicated by the dentist.

4. **Feature the latest technology**

Using the latest technology and state-of-the-art components allows a manufacturer to design an instrument with industry-leading functionality and the most efficient design. As an example, using LED (light emitting diode) technology versus halogen bulb technology (which the first intraoral camera systems used) greatly improved the system’s reliability and maintainability since all fiber-optic parts have been eliminated. Additionally, there is minimal heat generated with an LED system so the risk of camera failures due to poor ventilation is also eliminated. Lastly, the LED camera handpiece is smaller and lighter in design and offers a life span of approximately 10,000 hours compared to only 50 hours for the typical halogen-based system. As technology advances and improves, it does not necessary mean “more expensive”. Technology advances can also add additional functionality to a camera system that might otherwise be provided by another piece of equipment...real-time caries detection is an example.

5. **Depth of Field**

The Depth of Field (DOF) is the portion of a scene that appears sharply focused in an image. Areas beyond the focused portion of the filmed subject then become blurred. An example photo showing depth of field appears on the right. Selecting an intraoral camera with a large depth of field is important because this feature equates to greater versatility of the camera. When, an intraoral camera features a large “DOF”, it offers the operator the ability to view a variety of different fields with fewer focusing adjustments.

“DOF has an inversely proportional relationship with Focal Length: the smaller the focal length value of the lens, the greater “DOF” the lens will have. Conversely, the larger Focal Length number of the lens, the lesser “DOF” the lens will have. Therefore, the farther the camera is placed from the subject, the greater depth of field can be obtained. For dental applications, a depth of field of 5mm equals one tooth while a depth of field of 30mm equals a patient’s smile profile.

6. **Fixed Focus**

There are three types of focus:

- **Autofocus**: optical system that uses a sensor, a control system and a motor to focus fully on a point or area
- **Fixed Focus**: a lens for which the focus is not adjustable and is set for one distance between the subject and camera
- **Manual Focus**: a lens which can be adjusted manually. A manual focus adjustment is done by turning a ring, moving a button, or moving a slide.

Which one is best for intraoral cameras?

The short answer is Fixed Focus. Most “autofocus” intraoral cameras are actually “fixed focus” due to autofocus’ size, complexity and expense. “Fixed-focus” cameras usually have a large DOF to ensure that any subject you photograph within a certain distance is always in focus. The most versatile cameras have adjustable DOF ranges to allow focused images from 0mm to infinite distance. While using the camera on a patient, a fixed focus lens will allow the user to select and capture images using only one hand. The images will always remains sharp and clear.

7. **Lenses**

Optical quality lenses provide the camera with the ability to take accurate and proportionally correct images. The dental camera shall have at least one first lens for use in an intraoral mode, and additional lenses for use in other modes (portrait mode, macro mode, et al). The rule of thumb; more lenses means more modes and a greater variety of available shots.
8. **Analog and digital connections**

More and more offices are computerized, however a percentage of them remain without computers (what we’ll call digital equipment). To show images using an intraoral camera, they will use a TV/monitor (what we’ll call analog).

Different configurations are possible: Digital only, analog only, digital and analog together, analog today but maybe digital in the future...

Using a camera system which offers both analog and digital connections will fit anyone’s current and future needs.

9. **TWAIN function & compatible with other imaging software**

What is TWAIN an acronym for? “Technology Without An Interesting Name”

TWAIN is a standard software protocol and applications programming interface (API) that regulates communication between software applications and imaging devices such as scanners and digital cameras.

TWAIN standards provide a way to create a “universal” driver to permit any TWAIN compliant application to work with any TWAIN compliant device. A camera using a digital output (USB 2.0) must offer a TWAIN compliant driver (or be compatible) and allow the capture of images into their current software.

Users who already own imaging software will rarely change it for the one the manufacturer of the camera offers. To ease the integration of the camera with that software there are only two ways:

- Direct integration of the camera drivers into the Imaging Application (VFW, WDM)
- TWAIN Function

If the camera does not offer the TWAIN function or cannot be integrated with the imaging software owned, less efficient systems have to be used:

- 3rd party Foot Pedal
- Mouse of the computer
- Frame Capture Card (obsolete)

10. **Technical Support**

The manufacturer reflects the dealer’s image. The dealer reflects the Dentist’s image.

Once integrated into his daily treatment routine, a Dentist without their intraoral camera can be like a salesperson without his cell phone. Less efficient!

Offering a reliable product is not enough - In the event of a problem including failure or breakage, the manufacturer must be capable of repairing or replacing the product in a short period of time.

The manufacturer must also have an internal technical support team and field representation to assist dealers in the set-up, configuration, troubleshooting and overall support of the product.
Why is SOPRO the right choice?

1. Company information

-Background and Specialties-

SOPRO has specialized in video systems and medical cameras for more than 25 years. We develop our own prism, electronics and camera bodies... SOPRO cameras are designed with the newest technology which results in outstanding image quality. Today, more than 20,000 surgeons, doctors and dentists use a SOPRO camera. SOPRO is an ISO 9001 and EN 46001 certified company, ensuring from the first step of development that its products comply with all required standards. SOPRO belongs to the ACTEON Group, which is represented today by four (4) manufacturing plants that develop and manufacture piezo ultrasonic scalers (SATELEC P5 Newtron, P Max Newtron XS) LED-curing lights (MINI LED), pharmaceutical products (EXPASYL), x-ray equipment (X-Mind) and more... The Group also specializes in built-in equipment and OEM products.

We have ten (10) subsidiaries located around the world and over 500 employees. By continuing to invest in research & development by creating new and innovative products, we anticipate to remain number one each of our product categories.

To learn more about ACTEON (SOPRO & SATELEC), please visit our website: www.acteonusa.com

The US subsidiary (ACTEON North America) is located in Mount Laurel, New-Jersey where we have about 30 employees focusing on customer service, technical support and repair of the products. In addition, our field representation consists of 23 people who are dedicated to supporting our customers with demonstration equipment and equipment expertise.

-What do we bring to our customers?-

- High-tech, advanced and reliable equipment
- Support in the field with manufacturing reps and demonstration equipment
- Efficient and qualified customer service and support
- A technical support team available to you and your customers
- A fast repair turnaround (48 to 72 hours)
- Training on our products with quality training documents

-Contact Information-

To contact ACTEON North America for any reason, please call us at:

1-800-289-6367
9:00 - 7:30 EST
2. Which model of camera?

**SOPRO** offers 4 models of LED intraoral cameras - the **SOPRO 617**, the **SOPRO 717 First**, **SOPROLIFE**, and **SOPROCARE**.

### 2.1 SOPRO 617

The **SOPRO 617** is an LED intraoral camera available in the US since February, 2008. Since that date, the camera has been available with an enhanced capture function (SOPRO Touch) on the camera handpiece, a docking station to be built into a dental unit and two USB docking stations (MUSB, USB2).

#### 2.1.1 SOPRO 617 Quick Chart

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lighting</th>
<th>Focus</th>
<th>Depth field</th>
<th>On/Off</th>
<th>Image capture</th>
<th>Portable HP</th>
<th>Self contained HP</th>
<th>USB connection</th>
<th>Analog connection</th>
<th>Software</th>
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<tbody>
<tr>
<td></td>
<td>LED</td>
<td>Fixed</td>
<td>5mm to infinite</td>
<td>Automatic</td>
<td>Sopro Touch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Available</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Benefit</strong></td>
<td>8</td>
<td>One lens</td>
<td>Intraoral &amp; smile mode</td>
<td>With HP holder</td>
<td>Multi-op</td>
<td>Easy to clean</td>
<td>Available</td>
<td>S-Video</td>
<td>Composite</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sopro Imaging or other</td>
</tr>
</tbody>
</table>

#### 2.1.2 SOPRO 617 camera frequently asked questions:

- **Is the camera analog or digital?**
  - Both. We offer a digital only, and an analog and digital combination docking station.

- **Is the camera handpiece removable from the docking station?**
  - Yes, the camera cable disconnects at the end of the camera handpiece (push/pull).

- **Is the camera compatible with other software using the USB connection from the docking station?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **Is the SOPRO Touch compatible with other software?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **When the SOPRO Touch is not compatible with a software, application, what do you recommend?**
  - Use the TWAIN function, or a foot pedal to the computer or the mouse of the computer to freeze and save the image.

- **Are the built-in Docking stations compatible with any dental unit?**
  - Yes. The only difference between the docks is the color of the camera cable.

- **Can we turn off the LED and still use the camera?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **How do we turn off the camera?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **Does the handpiece holder come with the camera or the dock?**
  - Use the TWAIN function, or a foot pedal to the computer or the mouse of the computer to freeze and save the image.

- **What happens if we drop the camera?**
  - Yes. The only difference between the docks is the color of the camera cable.

- **Can we turn off the LED and still use the camera?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **How do we turn off the camera?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **Does the handpiece holder come with the camera or the dock?**
  - Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics.

- **What happens if we drop the camera?**
  - Yes. The only difference between the docks is the color of the camera cable.
2.1.3 The following are the detailed features and their benefits:

a - The camera uses LED technology and an automatic On/OFF

The SOPRO 617 uses eight (8) of the latest generation LEDs and automatic ON/OFF via its handpiece holder.

_advantages:

- No fiber optics in the camera cable:
  - Reduced risk of failure of the cable. When fibers break, it is very expensive to replace them
  - Reduced loss of light intensity vs. when fibers break, light intensity is reduced
  - Reduced weight of the cable vs. heavier and more fragile cables
  - Allows the camera to be portable vs. carrying the camera cable around
- The lifespan of the light is 10,000 hours vs. 50 hours of halogen life:
  - The halogen light requires a ventilator to cool the light which creates noise and requires a larger docking station
  - No changing of the LEDs is required
  - The light intensity is constant for 10,000 hours vs. the halogen lamp which diminishes with each use (like an LED curing light vs. halogen)
- More LEDs = more light = better image clarity
- When using a DOCK MUSB, the camera is OFF when placed in its handpiece holder and ON when you pick it up.

b - Compact camera handpiece

The electronics are completely contained in the camera handpiece.

_advantages:

- The camera handpiece weight of only 2 oz. makes it portable without causing hand fatigue
- The electronics are protected in the plastic case
- Casing can easily be replaced in case of failure
- The size of the docking station is consequently very small too

c - The focus is fixed

No focus adjustment is required while moving the camera around in the mouth. This is due to its large depth of field: 5 mm to infinite (from one complete tooth to a portrait).

_advantages:

- Only one hand is required to use the camera
- Capture motion does not drive the image out of focus
- Image is always clear

d - The capture function

Most of the cameras have a button located on or under the camera handpiece. When the button is depressed, movement causes the user to lose focus at the time of the capture. We use a sensitive “SOPRO Touch” sensor area. It is similar to the “Touch Pad” of a laptop computer. A light pass over it will capture the image... a feather touch is all that's needed. This can also be accomplished by using the existing rheostat.

_advantages:

- No movement is created when capturing
- The images are always sharp

Response to rejection of Sopro Touch:

- Some users may find it too sensitive and experience unintended captures:
  - Practice! If they are persistent, they will become facile and “love it”
  - If they “hate” it, we can supply different options:
- DOCK MU-USB/ Mini Dock U_USB2 - They can use the foot control of the dental unit. The dealer/installer has to connect the unit foot control to our dock using an “air electric switch normally open”.

e. Camera connections

The SOPRO 617 camera can be connected to any of the following docking station units:

<table>
<thead>
<tr>
<th>DOCK MU USB</th>
<th>A dual docking station with analog and digital connections to be built into a dental unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINI DOCK U_USB2</td>
<td>An affordable digital-only docking station to be built into a delivery head powered by the computer</td>
</tr>
</tbody>
</table>

- Advantages:
  - We can address every configuration requirement
  - We supply them with all necessary equipment for installation
  - Only one camera handpiece is required
The most important questions are:

A. What type of screen is the Doctor using? (TV/Monitor OR Computer; TV/Monitor AND Computer)
B. If a computer is involved, what imaging software is the Doctor using and how are images to be captured?

### A. What is involved?

<table>
<thead>
<tr>
<th>TV &amp; Monitor</th>
<th>Computer</th>
<th>TV, Monitor &amp; Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The doctor needs to display and hold an image on the screen to review information with the patient.</td>
<td>The doctor needs to display and save images into his computer.</td>
<td>The doctor needs to hold images on the screen for the review with the patient and at the same time he needs to save images into the computer.</td>
</tr>
<tr>
<td>We recommend using a docking station with MEMORY:</td>
<td>We recommend using any USB docking station:</td>
<td>We recommend using a dual docking station analog and digital:</td>
</tr>
<tr>
<td>DOCK MU-USB</td>
<td>DOCK MU-USB or Mini Dock U_USB2</td>
<td>DOCK MU USB</td>
</tr>
<tr>
<td>The connection is done using either the S-Video cable or the Composite cable (from the dock to the TV).</td>
<td>The connection is done via the USB plug or USB cable.</td>
<td>The connection to the TV is done via a S-Video or a Composite cable and the connection to the computer is done via the video cable.</td>
</tr>
<tr>
<td>Those cables are delivered with the docking stations and come in 7ft. length. If a longer length is needed, we supply a 15 ft. S-Video cable as an option</td>
<td>The drivers for the use of USB are included on the SOPRO imaging CD that comes with the docking station and are also available at:</td>
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</tbody>
</table>

### B. What software?

The **SOPRO 617** using the analog or USB connections works in almost all imaging software applications. The capture function **“SOPRO TOUCH”** is compatible or can be made to function with virtually all commercially available packages.

(For the most current list of compatible software packages please visit [http://www.acteonusa.com](http://www.acteonusa.com) or contact ACTEON Technical Support at 1-800-289-6367.)

For any other software, we recommend to using:

- The **TWAIN** function,
- A **Foot Control** into the computer (usually provided by the software company)
- The **Mouse** of the computer.
The SOPRO 717 First is an LED Intra & extraoral camera with a macro DOF setting launched in April 2010. The SOPRO 717 First combines the best features and advantages of a LED camera and the image quality of a halogen camera in a truly portable camera.

### 2.2.1 SOPRO 717 First Quick Chart

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lighting</th>
<th>Focus</th>
<th>Depth of field</th>
<th>On/Off</th>
<th>Image capture</th>
<th>Portable HP</th>
<th>Self contained HP</th>
<th>USB connection</th>
<th>Analog connection</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Feature</strong></td>
<td>New Generation LED</td>
<td>Fixed</td>
<td>0mm to infinite</td>
<td>Automatic</td>
<td>Sopro Touch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Available</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Benefit</strong></td>
<td>8</td>
<td>Macro, intra and extra oral position</td>
<td>Six lens</td>
<td>With hp holder</td>
<td>Foot control optional</td>
<td>Multi-op</td>
<td>Easy to clean</td>
<td>USB 2.0</td>
<td>S-Video and Composite</td>
<td>Sopro Imaging or other</td>
</tr>
</tbody>
</table>

#### 2.2.2 SOPRO 717 First camera frequently asked questions:

**Is the camera analog or digital?**

*Both. The DOCK MU-USB is analog and digital; The DOCK MU-Video is analog only.*

**Is the camera handpiece removable from the docking station?**

*Yes, the camera cable disconnects at the end of the camera handpiece (push/pull)*

**Is the camera compatible with other software using the USB docking station?**

*Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics*

**Is the SOPRO Touch compatible with other software?**

*Yes, visit [www.acteonusa.com](http://www.acteonusa.com) for specifics*

**When the SOPRO Touch cannot be made compatible with software, what do you recommend?**

*Use the TWAIN function, or a foot pedal to the computer or the mouse of the computer to freeze and save the image.

**Can we turn off the LED and still use the camera?**

*No*

**How do we turn off the camera?**

*Place the camera in its handpiece holder or disconnect it. The dock. If extra ones are needed, an order needs to be placed.*

**Does the handpiece holder come with the camera or the dock?**

*Yes*

**What happens if we drop the camera?**

*You may break the glass window. The shell of the camera will need to be changed. It is a fast repair.*
2.2.3 The following are the detailed features and their benefits:

a. The camera uses LED technology and an automatic On/OFF

The **SOPRO 717 First** uses 8 new generation LEDs.

- **Advantages:**
  - The new generation of LED allows:
    - 50% more brightness than the first generation -- the intensity of light is as good as a halogen camera.
    - Reduced size (by half) of the camera head due to its small size. The thinness of the camera head eases access to the back molars, especially with pediatric applications.
  - No fiber optics in the camera cable:
    - Reduced risk of failure of the cable. When fibers break, it is very expensive to replace them
    - Reduced the loss of light intensity when fibers break
    - Reduced weight of the cable vs. heavier, more fragile cables
    - Allows the camera to be portable vs. moving the entire camera system
  - The lifespan of the light is 10,000 hours vs. 50 hours of halogen life:
    - The halogen light requires a ventilator fan to cool the light which creates noise and requires a larger docking station
    - No changing of the LEDs is required
    - The light intensity is constant for 10,000 hours vs. the halogen lamp which diminishes with each use (like an LED curing light vs. halogen)
  - More LEDs = more light = better image clarity
  - When using a DOCK MUSB, MU_USB, or Mini Dock U_USB2 the camera is OFF when placed in its handpiece holder and ON when you pick it up.

b. Compact camera handpiece

The electronics are completely contained in the camera handpiece.

- **Advantages:**
  - The camera handpiece is very light and portable - making it easy to carry around
  - The electronics are protected in the plastic case
  - Casing can easily be replaced in case of failure
  - The size of the docking station is consequently very small too

c. The focus is fixed:

The camera offers 3 pre-selected focal positions: MACRO, INTRAORAL and PORTRAIT.

Once the position is selected, no additional focal adjustment is required while moving the camera around in the mouth. This is due to its depth of field setting which is preset for the appropriate application.

<table>
<thead>
<tr>
<th>Function</th>
<th>DOF</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>MACRO</td>
<td>0mm to 5mm</td>
<td>Provides 115x magnification for fine tooth details including craze lines, eroding margins, and failing restorations</td>
</tr>
<tr>
<td>INTRAORAL</td>
<td>5mm to 30mm</td>
<td>Single to Four teeth</td>
</tr>
<tr>
<td>PORTRAIT</td>
<td>30mm to Infinite</td>
<td>Full face, upper and lower arch, smile</td>
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- **Advantages:**
  - Only one hand is required to use the camera
  - Capture motion does not drive the image out of focus
  - Image is always clear
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Most of the cameras have a button located on or under the camera handpiece. When the button is depressed, movement causes the user to lose focus at the time of the capture. We use a sensitive “SOPRO Touch” sensor area. It is similar to the “Touch Pad” of a laptop computer. A light pass over it will capture the image... a feather touch is all that’s needed. This can also be accomplished by using the existing rheostat.

Advantages:

- No movement is created when capturing
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Response to rejection of Sopro Touch:

- Some users may find it too sensitive and experience unintended captures:
  - Practice! If they are persistent, they will become facile and “love it”
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    - DOCK MU-USB/ Mini Dock U_USB2 - They can use the foot control of the dental unit. The dealer/installer has to connect the unit foot control to our dock using an “air electric switch normally open”.

e. Camera connection

The SOPRO 717 First camera can be connected to any of the following docking station units:

| DOCK MU USB | MINI DOCK 2 | A dual docking station with analog and digital connections to be built into a dental unit |
| An affordable digital-only docking station to be built into a delivery head powered by the computer |

Advantages:

- We can address every configuration requirement
- We supply them with all necessary equipment for installation
- Only one camera handpiece is required
- Provides an analog solution that accommodates a planned change to digital
The most important questions are:

A. What type of screen is the Doctor using? (TV/Monitor OR Computer; TV/Monitor AND Computer)
B. If a computer is involved, what imaging software is the Doctor using and how are images to be captured?

A. What is involved?

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B. What software?

The SOPRO 717 First using the analog or USB connections functions in almost any imaging software application. The capture function “SOPRO TOUCH” is compatible or can be made to function with virtually all commercially available packages.

(For the most current list of compatible software packages please visit http://www.acteonusa.com or contact ACTEON Technical Support at 1-800-289-6367.

For any other software, we recommend to using:

- The TWAIN function,
- A Foot Control into the computer (usually provided by the software company),
- The Mouse of the computer.
The SOPRO LIFE is not just another intraoral camera. It is a LED intra and extraoral camera equipped with both a caries detection and caries treatment mode. It was launched in the USA in January 2010.

The SOPRO LIFE is a truly unique product offering from ACTEON and is the only device of its kind to use fluorescence to analyze the structure of a tooth using real-time video. Blue LED light penetrates the tooth’s enamel and the resultant fluorescent signal is processed, using a green and red video signals to identify healthy and affected dentine.

### 2.3.1 SOPROLIFE Quick Chart

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lighting</th>
<th>Focus</th>
<th>Depth of field</th>
<th>On/Off</th>
<th>Image capture</th>
<th>Portable HP</th>
<th>Self contained HP</th>
<th>USB connection</th>
<th>Analog connection</th>
<th>Software</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Newest Generation LEDs</td>
<td>Fixed</td>
<td>0mm to infinite</td>
<td>Automatic</td>
<td>Sopro Touch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Available</td>
<td>Yes</td>
</tr>
</tbody>
</table>
| Benefit                  | 4 White LEDs  
4 Blue LEDs | Macro, intraoral, extraoral, One tooth | Six lens | With hp holder | Foot control optional | Multi-op | Easy to clean | Sopro Imaging or other | USB 2.0 | 5-Video and Composite |

### 2.3.2 SOPRO LIFE camera frequently asked questions:

**Is the camera analog or digital?**

Both, depending on docking station chosen. MUSB and MU_USB have both digital and analog where the USB2 and Mini Dock U_USB2 are digital only.

**Is the camera handpiece removable from the docking station?**

Yes, the camera cable disconnects at the end of the camera handpiece (push/pull).

**Is the camera compatible with other software using the USB docking station?**

Yes. Visit [http://www.acteonusa.com](http://www.acteonusa.com) for details.

**Is the SOPRO Touch compatible with other software?**

Yes. Visit [http://www.acteonusa.com](http://www.acteonusa.com) for details.

**When the SOPRO Touch is not compatible with software, what do you recommend?**

Use the TWAIN function, or a foot pedal to the computer or the mouse of the computer to freeze and save the image.

**Can we turn off the LED and still use the camera?**

No

**How does SOPROLIFE work?**

SOPROLIFE’s blue LEDs emit light at 450 nm which penetrates the enamel and excites the dentin, in reaction, fluoresces back a color.

**How is SOPROLIFE different from other caries detection devices?**

SOPROLIFE analyzes the fluorescent signal emitted by the tooth to determine structural changes to the dentin. Other methods calculate density of bacteria or analyze subjective changes in the tooth.

**What is the difference between diagnosis mode and treatment mode?**

The red light is amplified during treatment mode to ensure the doctor removes all diseased tissue when excavating. If treatment mode is used during diagnosis the dental professional will encounter false alerts due to organic material. The diagnosis mode is far less sensitive to organic deposits.

**What fluoresce in caries?**

Collagen links are broken due to an acid attack which induces a fluorescence signal modification.
2.3.3 The following are the detailed features and their benefits:

a. The camera uses LED technology and an automatic On/OFF

The SOPRO LIFE uses 8 newest generation LEDs - 4 White, 4 Blue.

- Advantages:
  - The newest generation of LED allows:
    - LED technology is continually being enhanced. Each generation is twice the brightness of the previous, typically using much less power.
    - Reduced size (by half) of the camera head due to its small size. The thinness of the camera head eases access to the back molars, especially with pediatric patients.
  - No fiber optic in the camera cable:
    - Reduced risk of failure of the cable. When fibers break, it is very expensive to replace them
    - Reduced the loss of light intensity when fibers break
    - Reduced weight of the cable vs. heavier, more fragile cables
    - Allows the camera to be portable vs. moving the entire camera system
  - The lifespan of the light is 10,000 hours vs. 50 hours of halogen life:
    - The halogen light requires a ventilator fan to cool the light which creates noise and requires a larger docking station
    - No changing of the LEDs is required
    - The light intensity is constant for 10,000 hours vs. the halogen lamp which diminishes with each use (like an LED curing light vs. halogen)
  - Better LEDs = better light = better image quality
  - When using a DOCK MUSB, MU_USB, or Mini Dock U_USB2 the camera is OFF when placed in its handpiece holder and ON when you pick it up.

b. Compact camera handpiece

The electronics are completely contained in the camera handpiece.

- Advantages:
  - The camera handpiece is very light and portable – making it easy to carry around
  - The electronics are protected in the plastic case
  - Casing can easily be replaced in case of failure
  - The size of the docking station is consequently very small too

c. The focus is fixed:

The camera offers 4 pre-selected positions: MACRO, INTRA, EXTRA ORAL, One tooth.

Once the position is selected, no focusing is required while moving the camera around in the mouth. This is due to its large depth of field: (1 mm to infinite)

Definition of the functions:

<table>
<thead>
<tr>
<th>Mode</th>
<th>DOF</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACRO</td>
<td>0mm to 5mm</td>
<td>Provides 115x magnification for fine tooth details including craze lines, eroding margins, and failing restorations</td>
</tr>
<tr>
<td>One Tooth</td>
<td>Single Tooth</td>
<td>Optimized for caries detection modes</td>
</tr>
<tr>
<td>INTRAORAL</td>
<td>5mm to 30mm</td>
<td>Single to Four teeth</td>
</tr>
<tr>
<td>EXTRA-ORAL</td>
<td>30mm to Infinite</td>
<td>Full face, upper and lower arch, smile</td>
</tr>
</tbody>
</table>

- Advantages:
  - Only one hand is required to use the camera and capture images
  - Accommodates every imaging need
  - Image is always clear

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Website: www.acteonusa.com • Email: info@us.acteongroup.com
d - The capture function

Most of the cameras have a button located on or under the camera handpiece. When the button is depressed, movement causes the user to lose focus at the time of the capture. We use a sensitive “SOPRO Touch” sensor area. It is similar to the “Touch Pad” of a laptop computer. A light pass over it will capture the image… a feather touch is all that’s needed. This can also be accomplished by using the existing rheostat.

- Advantages:
  - No movement is created when capturing
  - The images are always sharp

Response to rejection of Sopro Touch:
  - Some users may find it too sensitive and experience unintended captures:
    - Practice! If they are persistent, they will become facile and “love it”
    - If they “hate” it, we can supply different options:
      - DOCK MU-USB/Mini Dock U_USB2 -> They can use the foot control of the dental unit. The dealer/installer has to connect the unit foot control to our dock using an “air electric switch normally open”.

e. Camera connection

The SOPRO LIFE camera can be connected to any of the following docking station units:

<table>
<thead>
<tr>
<th>DOCK MU USB</th>
<th>A dual docking station with analog and digital connections to be built into a dental unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINI DOCK U_USB2</td>
<td>An affordable digital-only docking station to be built into a delivery head powered by the computer</td>
</tr>
</tbody>
</table>

- Advantages:
  - We can address every configuration requirement
  - We supply them with all necessary equipment for installation
  - Only one camera handpiece is required
  - Provides an analog solution that accommodates a planned change to digital
The most important questions are:

A. What type of screen is the Doctor using? (TV/Monitor OR Computer; TV/Monitor AND Computer)
B. If a computer is involved, what imaging software is the Doctor using and how are images to be captured?

A. What is involved?

<table>
<thead>
<tr>
<th>TV &amp; Monitor</th>
<th>Computer</th>
<th>TV, Monitor &amp; Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The doctor needs to display and hold an image on the screen to review information with the patient.</td>
<td>The doctor needs to display and save images into his computer.</td>
<td>The doctor needs to hold images on the screen for the review with the patient and at the same time he needs to save images into the computer.</td>
</tr>
<tr>
<td>We recommend using a docking station with MEMORY: DOCK MU-USB</td>
<td>We recommend using any USB docking station: DOCK MU-USB or Mini Dock U_USB2</td>
<td>We recommend using a dual docking station analog and digital: DOCK MU USB</td>
</tr>
<tr>
<td>The connection is done using either the S-Video cable or the Composite cable (from the dock to the TV).</td>
<td>The connection is done via the USB plug or USB cable.</td>
<td>The connection to the TV is done via a S-Video or a Composite cable and the connection to the computer is done via the video cable.</td>
</tr>
<tr>
<td>Those cables are delivered with the docking stations and come in 7ft. length. If a longer length is needed, we supply a 15 ft. S-Video cable as an option.</td>
<td>The drivers for the use of USB are included on the SOPRO imaging CD that comes with the docking station and are also available at: <a href="http://www.acteonusa.com">www.acteonusa.com</a></td>
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</table>

B. What software?

SOPROLIFE using the analog or USB connections works in almost all imaging software applications. The capture function “SOPRO TOUCH” is compatible or can be made to function with virtually all commercially available packages.

(For the most current list of compatible software packages please visit http://www.acteonusa.com or contact ACTEON Technical Support at 1-800-289-6367.)

For any other software, we recommend to using:

- The TWAIN function,
- A Foot Control into the computer (usually provided by the software company)
- The Mouse of the computer.
The SOPROCARE concept was developed to answer the needs of the dental professional during prophylaxis and periodontal treatment in the office. SOPROCARE is the first and only camera with the ability to reveal caries, plaque, tartar, and gingival inflammation.

SOPROCARE utilizes patented fluorescence technology to illuminate dental tissue with the specific wavelength of 440-680 nm. The exposed tissue absorbs the energy and fluoresces back a color. Images obtained through fluorescence analysis are superimposed over the images, creating an easy to interpret representation of the tissues condition, which would otherwise be invisible under white light.

2.3.1 SOPROCARE Quick Chart

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lighting</th>
<th>Focus</th>
<th>Depth of field</th>
<th>On/Off</th>
<th>Image capture</th>
<th>Portable HP</th>
<th>Self contained HP</th>
<th>USB connection</th>
<th>Analog connection</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefit</td>
<td>Newest Generation LEDs</td>
<td>Fixed</td>
<td>0mm to infinite</td>
<td>Automatic</td>
<td>Sopro Touch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Available</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>4 White LEDs</td>
<td>Macro, intraoral, extra-oral, One tooth</td>
<td>0mm to infinite</td>
<td>With holder</td>
<td>Foot control optional</td>
<td>Multi-op</td>
<td>Easy to clean</td>
<td>USB 2.0</td>
<td>S-Video and Composite</td>
<td>Sopro Imaging or other</td>
</tr>
</tbody>
</table>

2.3.2 SOPROCARE camera frequently asked questions:

- **Is the camera analog or digital?**
  - Both, depending on docking station chosen. MUSB and MU_USB have both digital and analog where the USB2 and Mini Dock U_USB2 are digital only.

- **Is the camera handpiece removable from the docking station?**
  - Yes, the camera cable disconnects at the end of the camera handpiece (push/pull).

- **Is the camera compatible with other software using the USB docking station?**

- **Is the SOPRO Touch compatible with other software?**

- **When the SOPRO Touch is not compatible with software, what do you recommend?**
  - Use the TWAIN function, or a foot pedal to the computer or the mouse of the computer to freeze and save the image.

- **Can we turn off the LED and still use the camera?**
  - No.

- **How does SOPROCARE work?**
  - Blue and white LEDs illuminate dental tissue with the specific wavelength of 440-680 nm. The exposed tissue absorbs the energy and fluoresces back a color. Images obtained through fluorescence analysis are superimposed over the images, creating an easy to interpret representation of the tissues condition.

- **Why does calculus emit a yellow or orange color?**
  - The color of dental plaque can be a different depending on dietary habits and the degrees of calcification of plaque. The tartar will have more developed bacteria which will fluoresce back an orange color.

- **Why is there still a yellow tint after scaling?**
  - The remaining yellow is due to organic materials that have penetrated the enamel.
What fluoresce in caries?

Collagen links are broken due to an acid attack which induces a fluorescence signal modification.

2.3.3 The following are the detailed features and their benefits:

a. The camera uses LED technology and an automatic On/OFF

The SOPROCARE uses 7 newest generation LEDs - 4 White, 3 Blue.

- Advantages:
  - The newest generation of LED allows:
    - LED technology is continually being enhanced. Each generation is twice the brightness of the previous, typically using much less power.
    - Reduced size (by half) of the camera head due to its small size. The thinness of the camera head eases access to the back molars, especially with pediatric patients.
  - No fiber optic in the camera cable:
  - Reduced risk of failure of the cable. When fibers break, it is very expensive to replace them
  - Reduced the loss of light intensity when fibers break
  - Reduced weight of the cable vs. heavier, more fragile cables
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  - The lifespan of the light is 10,000 hours vs. 50 hours of halogen life:
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  - The electronics are protected in the plastic case
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c. The focus is fixed:

The camera offers 4 pre-selected positions: MACRO, INTRA, EXTRA ORAL, and ONE TOOTH.

Once the position is selected, no focusing is required while moving the camera around in the mouth. This is due to its large depth of field: (1 mm to infinite)

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<td>Single Tooth, optimized for caries detection modes</td>
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