FOREWORD

Air Techniques has prepared this document as a guide to the proper use of the Polaris Intraoral Video Camera System. Review and follow the guidelines included in this Operator’s Manual to ensure that your Polaris gives you the highest level of service.

For product support and information on how to expand Polaris, contact your authorized Air Techniques dealer; call our Technical Support at 1-800-247-8324 or visit the web site, www.airtechniques.com.

CONGRATULATIONS

Congratulations on your purchase of Polaris, the latest standard definition camera in the dental video imaging product line from Air Techniques, a leading manufacturer of dental equipment since 1962.

Polaris offers the flexible benefits of USB Plug-N-Play technology that is easily integrated into any practice. The lightweight one-piece handpiece is extremely maneuverable and produces crisp, clear images.

This manual covers the installation, operation and maintenance of:

Polaris Intraoral Video Camera System, part number G5000

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This equipment has been designed to minimize exposure of personnel to hazards. While Polaris is designed for safe operation, certain precautions must be observed. Not complying with the instructions specified in this manual while using Polaris may result in permanent failure of the unit.

KNOWLEDGE OF WARNINGS AND CAUTIONS

Users must exercise every precaution to ensure personnel safety, and be familiar with the warnings and cautions presented throughout this manual and summarized below.

Warnings. Alerts user to pay special attention to anything that could injure personnel.

- Exposing Polaris to rain or moisture may pose the risk of electrical shock or fire.
- Unplug the system components from power before cleaning.

Cautions. Draws special attention to anything that could damage equipment or cause the loss of data.

- There are no user-serviceable parts inside. Servicing should be performed by qualified dealer service representatives only.
- Connecting any device to Polaris that does not meet the equivalent safety requirements of the system may reduce the safety effectiveness of the device.
- Do not autoclave the Camera Handpiece.
- Do not spray liquids directly on Polaris or the cable.
- Do not immerse the Camera Handpiece in liquid of any kind.
- Do not allow liquids to run into internal circuitry.
- Cleaning products containing the ingredients listed below are prohibited for use with Polaris. These chemicals can cause damage to the plastic parts used on the camera body.

- Ammonia
- CaviCide™
- CaviWipes™
- Ethanol
- Iodine solutions
- Methyl Ethyl Ketone
- Ammonium Chloride
- CaviCide1™
- Denatured alcohol
- Ethylene Glycol Monobutyl Ether
- Isopropyl alcohol (higher than 70%)
- Opti-Cide³®
- Benzene
- CaviWipes™
- DisCide® Ultra
- Glutaraldehyde
- Lysol®
- Phenol based compounds

Contraindications.

None

Use of Accessory Equipment.

Polaris is intended to provide a level of safety consistent with the IEC 60601-1 standard for medical equipment. In order to achieve this, Polaris must be used with a computer and any other accessory equipment that complies with the IEC 60950-1 standard for information technology equipment (ITE) and this equipment must be set-up outside the immediate patient environment.

Use of ACCESSORIES or cables other than those specified or provided by the manufacturer may result in increased EMISSIONS or decreased IMMUNITY of Polaris.

Do Not Attempt Internal Service.

The interior of the camera is only accessible by removing hardware with tools and should only be opened and serviced by an authorized service technician. Contact your local Air Techniques authorized dealer for service. Failure to heed this directive may result in equipment damage and voiding the warranty.
COMPONENT DESCRIPTION

Camera Handpiece - The handpiece is extremely lightweight with a high resolution, high sensitivity, auto-exposure controlled CCD sensor and a high performance lens system illuminated by ultra-bright white LED lamps. The fixed focus lens has a broad depth of field enabling the camera to finely detail a section of a single tooth or show the whole mouth. Two tactile buttons on the handpiece enable the user to have precise control of Polaris even when rotating the device to access a certain area in the patient’s mouth. The specific functions performed by the keypad buttons depend on the user-supplied compatible streaming video capture software application used.

Camera Sheaths Sample Pack - Provides a sample quantity of 50 disposable camera sheaths used as an effective barrier preventing any infection hazard to the patient.

Handpiece Cable - A 10-foot cable that is used to connect the handpiece to the user’s computer. One end of the cable has a keyed, 5-pin quick disconnect connector for connection to the handpiece and the other end has a Type A USB connector for connection to a high power (500 mA) USB 2.0 port on the user’s computer. This cable carries all power, video and keypad button control signals for the handpiece.

Handpiece Holder - The Handpiece Holder can be fastened in a convenient location for safe storage of the handpiece when it is not in use.

Compact Disk - A CD that includes:
1. USB Device Drivers, Demonstration Program and Utilities
2. PDF version of Operator’s Manual
3. Adobe Acrobat Reader
Polaris consists of a Camera Handpiece, a Camera Handpiece Cable and associated accessories. The handpiece, cable, accessories and software may be purchased together under part number G5000. Some of the items may be purchased individually by the part numbers listed on page 17. Polaris, Part Number G5000, includes:

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera Handpiece (P/N G5100)</td>
<td>1</td>
<td><img src="image" alt="Camera Handpiece" /></td>
</tr>
<tr>
<td>Disposable Camera Sheaths Sample Pack for the Handpiece</td>
<td>50</td>
<td><img src="image" alt="Disposable Camera Sheaths Sample Pack" /></td>
</tr>
<tr>
<td>Handpiece Cable, 10 feet</td>
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<td><img src="image" alt="Handpiece Cable" /></td>
</tr>
<tr>
<td>Handpiece Holder Mounting Kit</td>
<td>1</td>
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<td>CD containing -</td>
<td>1</td>
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</tr>
<tr>
<td>PDF version of Operator’s Manual</td>
<td></td>
<td></td>
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<tr>
<td>USB Device Drivers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration Program and Utilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adobe Acrobat Reader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Start Instructions</td>
<td>1</td>
<td><img src="image" alt="Quick Start Instructions" /></td>
</tr>
</tbody>
</table>
General Notes

- All instructions in this manual form an integral part of the unit. Precise observance of these instructions is a pre-condition for use of the unit for the intended purpose and for its correct operation. This manual should be passed on to any future operator.

- Safety of the operator as well as trouble-free operation of the unit are only ensured by using original parts made by the manufacturer. Use only those accessories that are specified in the technical documentation or that have been expressly approved and released by the manufacturer for the intended purpose. The manufacturer warrants the safety and functioning of this device only when the user expressly abides by these instructions.

- Observe the usage and storage conditions.

- Polaris may only be operated using authorized software.

- The manufacturer intends to accept responsibility for the equipment with regard to safety, reliability and proper functioning only if assembly, resetting, changes or modifications and repairs have been carried out by an authorized dealer and if the equipment is used in conformity with the instructions contained in this manual.

- The device conforms to the relevant safety standards valid at this time.

- Any reprinting of the technical documentation, in whole or in part, is subject to prior written approval by the manufacturer.

Incorrect Usage

- Any use that is not described in this manual as correct usage is considered incorrect usage. The manufacturer is not liable for any damage caused as a result of incorrect usage. The operator bears all risks.
IMPORTANT: When operating Polaris connected to a high power (500 mA) USB 2.0 port on a Computer System, the computer must also be loaded with Air Techniques Authorized TWAIN or DirectX 9 compliant streaming video software application such as VISIX. Contact your dealer for available Computer Systems and software options.

NOTE: VISIX Imaging Software is fully compatible with Polaris.

Minimum Computer System Requirements - The minimum computer system requirements necessary to operate Polaris are listed below.

Operating System:
- Windows XP Professional with Service Pack 3 or later for an Intel 32-bit processor;
- Windows 7 Professional, Enterprise, or Ultimate with Service Pack 1 or later for an Intel 32-bit or an Intel 64-bit extended (x64) processor;
- Windows 8.1 Professional or Enterprise for an Intel 32-bit or an Intel 64-bit extended (x64) processor; or
- Windows 10 Pro or Enterprise for an Intel 32-bit or Intel 64-bit extended (x64) processor.

Imaging Software: Authorized third-party TWAIN or DirectX 9 compliant software.

CPU Speed: Pentium-4, 2 GHz or higher
System RAM: 256 MB
Optical Drive: CD-ROM Capable
Monitor: 800 x 600 resolution or higher
Video Display: 16 MB video card with 800 x 600 pixel resolution and 32-bit color
USB Port: USB 2.0 High-Speed, High-Power Port

System Properties.
If unsure of the operating system version installed, check that it meets the necessary requirements by checking the System Settings window as shown below.
The System Settings window can also be opened from the Control Panel button. Just press the Start button and select Control Panel and then click the System icon.
HANDPIECE FUNCTIONS

Power Button and Cable Connector -

1. Handpiece Connector - A 5-pin connector socket that accepts connection of the keyed 5-pin quick disconnect end of the Handpiece Cable.

2. ON/OFF Button - Momentarily press this button to toggle the camera between on and off/standby states.

Keypad Buttons - Each keypad button provides the handpiece fingertip control over the PC streaming video capture software via the Handpiece Cable. The specific functions performed by the keypad buttons depend on having the appropriate software installed on the user’s computer. Typical keypad actions are provided below.

NOTE: Simultaneously depressing both keypad buttons for approximately 3 seconds deactivates the Handpiece LED light source when in the Live Acquisition window. This is commonly used when imaging an X-ray on a light box.

3. Top Keypad Button - Press and release to send a Button 1 command to the PC. While the specific function performed depends on the setting of the video capture software application installed on the PC, this command typically freezes and unfreezes the image that is displayed on the computer monitor.

4. Bottom Keypad Button - Press and release to send a Button 2 command to the PC. While the specific action depends on the video capture software installed, it typically saves the image displayed on the computer monitor to the computer hard disk.
Installing Polaris is as simple as making the necessary connections of the Handpiece Cable between a PC and the Camera Handpiece. An imaging software application authorized by Air Techniques, such as VISIX, must also be installed on the PC. Perform the following procedures to set up Polaris.

**NOTES:** A Microsoft® Driver Not Signed statement may appear. If it does, click Continue to proceed with installation.

**IMPORTANT:** Device drivers must be installed before Polaris will operate properly.

**Device Driver Installation** - Before connecting Polaris to your computer or attempting to use it for the first time, run the Setup program on the Drivers and Utilities Disk. This CD contains the necessary device drivers to communicate with the imaging software installed on the user’s computer.

Normally, this program runs automatically when the CD is inserted into the drive for the first time. If not, run the setup program located in the root directory of the CD (typically `D:\Autorun.exe`).

Install the Standard Device Drivers by selecting Standard (default option) from the Setup program menu. If full device functionality is not present after the Standard Device Drivers are installed, the Legacy Device Drivers may need to be installed. More information can be found in the Installation Instructions and Notes file on the Drivers and Utilities Disk.

❗ Do not twist or turn the Handpiece Cable connector. The connector is keyed and mates straight on with Handpiece connector.

**Handpiece Connection** - Connect the Handpiece Cable to the Handpiece as follows:

1. Using the black molded connector end of the Handpiece Cable, align the connector key with the keyway of the Handpiece connector.

2. Insert straight into Handpiece connector until it securely snaps into place.
**IMPORTANT:** Use a High Power (500 mA) USB 2.0 Port Only

**USB Interface Connection** - Connect the USB Type A connector side of the Handpiece Cable to any available USB 2.0 High Speed, high power port on the user supplied Computer System. A self-powered USB hub can be used to extend the handpiece cable length. Do not use a BUS - powered hub or extension cable.

**Handpiece Holder Mounting** - The Handpiece Cable is designed to fit in a standard chair-side holder with or without the device attached. The Handpiece Holder Kit included with your unit provides an alternative storage solution. If used, install the holder as follows.

1. Select a flat, clean dry wall surface convenient to where the handpiece is located.
2. Secure the molded mounting bracket to the wall using the two screws provided.
3. Carefully align the channel of the holder with the wall mount bracket.
4. Slide the holder all the way down on the wall mount bracket.
Whether detaching just the Camera Handpiece from the Handpiece Cable and using it with additional Polaris Handpiece Cables installed on other computers or moving the complete system (handpiece and cable), Polaris is easily shared among patient operatories.

Refer to the corresponding illustrations and perform the following steps when transporting only the handpiece.

1. Retract the collar of quick disconnect connector and simultaneously pull straight from the handpiece.
2. Release the connector quick disconnect collar.
3. Store the Handpiece Cable by placing the quick-disconnect collar into the Handpiece Holder.
4. Transport the handpiece to next operatory.
5. Connect the handpiece at new location by aligning the connector key of the cable with the keyway of the mating connector of the handpiece.
6. Insert straight into the handpiece connector until it securely snaps into place.

When transporting the complete system (handpiece and cable) among patient operatories, simply disconnect the USB connector end of the Handpiece Cable, transport the system and reconnect to the new computer. Make sure that the computer in the new operatory is properly setup and using compliant software.

**CAUTION:** Always handle the handpiece carefully.

Do not drop and make sure to protect the optical window from scratches.
Do not pull handpiece from a standard chair-side holder. Always lift the handpiece straight up from the holder to avoid damage to the connector.
Disposable Camera Sheath Installation - Install a new Camera Sheath on the Handpiece for each patient as follows:

1. Remove the handpiece from the holder.
2. Insert the handpiece tip between the second and third layers (between the outer paper and plastic layers) with the camera/light facing towards the paper layer. See A and B.
3. Push the tip completely in until it is fully inserted into the narrow section of the sheath.
4. Gently squeeze the illuminated tip of the handpiece between the thumb and index finger to ensure that the optically clear area of the camera sheath is flat against the lens tip. See C.
5. Peel away and discard the top plastic layer and the bottom paper layer. See D.

**NOTE:**
For optimum image clarity, the optically clear section of the camera sheath must be aligned with the camera lens by facing the camera/light source section of the handpiece down toward the paper layer.

The handpiece should only be used with a Camera Sheath that prevents any infection hazard to the patient. Make sure to use a new disposable Camera Sheath for each patient.

The Camera Sheath must be used for only one patient and disposed of properly in accordance with local code.
Polaris is operated when connected directly to a computer system running various PC USB streaming video capture software applications such as VISIX. The camera provides the image/video source while the computer and associated software are used to display and save the resultant images. Perform the following procedures to operate Polaris when correctly connected to a computer.

1. Start the imaging software.

2. Remove the handpiece from the holder and press the ON/OFF button to activate the camera. Verify that the LED light source turns on and that the computer display shows the high-resolution live video images taken by the camera.

3. Place the camera lens window over area of interest and view image on computer display monitor.

4. Press and release the top keypad button on the handpiece to freeze (ie. capture) the displayed image on the computer monitor screen. Press and release the top keypad button again to unfreeze the displayed image.

5. Press and release the bottom keypad button on the handpiece to save the captured image to the computer hard drive and then to return to a live image display.

6. Repeat steps 3 through 5 as necessary.

7. When imaging an X-ray film on a light box, deactivate the LED light source by depressing both handpiece buttons simultaneously for approximately 3 seconds. Perform steps 3 through 5 to freeze and save the X-ray film image as desired.

   Depress both handpiece buttons simultaneously for approximately 3 seconds to turn ON the LED light source as desired.

8. Press the ON/OFF button to turn the camera OFF. Verify that the LED light source turns off and the camera turns OFF and return the handpiece to the holder.
USB Video Diagnostic - If live video is not displayed on the PC monitor of the Polaris when the imaging software application is running, there could be a problem with the settings in the software application or with the handpiece. Perform the following USB Video Diagnostic procedure to check that the Polaris handpiece is working correctly, the Polaris Handpiece Cable is correctly connected between the Polaris and the computer and the Polaris USB driver files are installed correctly on the PC.

1. Go to the Start button and select All Programs.
2. Select the Air Techniques program option and click on Camera Demonstration Program and observe that the Camera Demonstration Program screen opens.
3. Depending on the outcome of the diagnostic, perform one of the following:
   a. If a live image is correctly displayed, exit from the application and make sure that the imaging software application is configured correctly.
   b. If a live image is not displayed, exit from the application and check the handpiece, Polaris Handpiece Cable and USB driver file installation.
4. Reset the driver's video settings by performing the following:
   a. On the Polaris Demonstration Program screen, click the Properties button located on the lower left of the live image screen.
   b. On the Properties screen, select the VIDEO PROC AMP tab and then click the DEFAULT button. The image colors should now be correct. Click OK to close the Properties screen and exit from application.
INSPECTION AND CLEANING
Perform the following inspection and cleaning procedures periodically to keep Polaris in optimal condition resulting in trouble-free operation producing crisp, clear images.

Do not attempt any internal service of Polaris components. Contact your local authorized Air Techniques dealer for service. Failure to heed this warning may result in equipment damage and voiding the warranty.

Inspection - Routinely inspect each component of Polaris for possible defects as follows:

1. Camera Handpiece -
   a. Check overall handpiece for chips, cracks or other irregularities.
   b. Check the lens window for debris or spots.
   c. Check the connector socket for damage.

2. Cables and Connectors -
   a. Check cables for damaged or deteriorated insulation kinking or twisting.
   b. Check connectors for loose, bent or missing pins.
   c. Check that the quick-disconnect plug end snaps into handpiece connector to snugly secure the cable to the handpiece.

   • Do not autoclave the Camera Handpiece.
   • Do not spray handpiece directly with liquids.
   • Do not rinse or immerse the handpiece in liquids.
   • Use care not to allow liquids to run into internal circuitry.
   • Do not wipe the surfaces using prohibited chemicals listed on page 3 as they may degrade the finish.
   • Do not apply excessive pressure when wiping; do not scrub.

   CAUTION: Unplug Polaris components before performing cleaning.

The Camera Sheath must be used for only one patient and disposed of properly in accordance with local code.

Surface Cleaning Instructions - Clean the handpiece following each patient use. The cleaning instructions must be followed carefully to prevent damage to the camera housing, and internal components. Cleaning products containing active ingredients listed on page 3 are prohibited for use with Polaris. These chemicals can cause damage to the camera and could void the warranty.

1. Disconnect the USB cable. Remove the Camera Sheath and dispose in accordance with local regulations and clean handpiece as follows.

2. Moisten a cloth with warm water and remove any excessive moisture from the cloth before wiping the handpiece.

3. Wipe outer camera body with the moist cloth to ensure no pooling of water surrounds capture switch, ON/OFF switch or USB connection.

4. Window Lens may be cleaned with a cotton swab that is moistened with alcohol.

5. Allow the handpiece sufficient time to air dry
**SPECIFICATIONS**

Input Power: USB powered device using less than 500 mA at 5 volts DC. No external power supply is required. No mains connection.

Video Outputs: High Speed USB 2.0 Video

Sensor: ¼ Inch CCD

Pixels: 640 H X 480 V

Illumination: Ultra-bright white LED lamps

Exposure Control: Automatic

Image: Normal, not mirrored

Focal Range: 0.24 to 1.57 inches (6 to 40 mm)

Viewing Angle: 42 Degrees horizontal

Operating Temperature: 10 to 40° C (50 to 104° F)

Storage Temperature: 0 to 70° C (32 to 158° F)

Humidity: 10 to 90% non-condensing

Compliance -

Device Class: USA - FDA Class I Device, listing E197995

Canada - MDR/Class I

Classifications: Portable, Continuous Operation, Type BF Applied Part

Flammable Atmosphere: Cannot use in the vicinity of flammable anesthetic mixtures of air, oxygen or nitrous oxide.

Water/Particulate Matter

Ingress Protection: IP40

Electromagnetic Compatibility Conforms to IEC 60601-1-2 See Appendix A.

**PHYSICAL CHARACTERISTICS**

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<thead>
<tr>
<th>Dimensions</th>
<th>Length</th>
<th>Diameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handpiece G5100:</td>
<td>8.8 inches (22.35 cm)</td>
<td>1.1 inches (2.79 cm)</td>
<td>2.9 oz. (82 g)</td>
</tr>
<tr>
<td>Handpiece Cable G1150:</td>
<td>10 feet (3.05 m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following lists the ordering number and description for accessory components available to maintain and expand the Polaris to meet your professional needs. Contact your Air Techniques Dealer for information.

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G5000</td>
<td>Complete Polaris System as listed on page 5.</td>
</tr>
</tbody>
</table>

Separately packaged accessory components

- G5010  Polaris Handpiece
- G1151  Polaris Handpiece Cable
- G4011  Handpiece Holder Kit

Replacement Disposable Camera Sheaths for Handpiece

- G5111  Box of 100
- G5110  Box of 500

Imaging Software for Polaris

- D7365  VISIX for Polaris Software
- D4040  VISIX Support Package
- 74500  Comprehensive VISIX Imaging Software, 5 licenses

**VISIX IMAGING SOFTWARE**

Consider VISIX, our comprehensive digital imaging software application, providing seamless integration with all our digital imaging ScanX PSP Systems and Polaris Intraoral Cameras.

**Key Features.**

- Easy to learn.
- Simple to use.
- Acquire, mount, view and store images with just a few mouse clicks.
- Exposure - Our Stop Light Exposure System is a unique indicator to ensure optimum data capture. It helps you acquire great images by monitoring X-ray exposure.
- Viewing - VISIX provides automatic image mounting that is completely customizable.
- Flexibility - VISIX includes a built-in bridging solution to over 35 Practice Management Software titles.

VISIX is the superb software complement for Polaris. Contact your authorized dealer for further information.
Polaris is warranted to be free from defects in material and workmanship from the date of installation for a period of 2 years (24 months).

All part and component returns and replacement equipment under warranty require a Return Materials Authorization (RMA). Warranty returns must be received within three months of the RMA issue date. Items returned without an RMA, or included with other products for which an RMA has been issued, may be returned to the customer at the discretion of Air Techniques, Inc.

Any item returned under warranty will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Air Techniques, Inc. is not liable for indirect or consequential damages or loss of any nature in connection with this equipment. Dealer labor, shipping and handling charges are not covered by this warranty.

Warranty credit will not be applied to product returns that exhibit damage due to shipping, misuse, careless handling or repairs by unauthorized personnel. Credit, or partial credit, will not be issued until products/parts have been received and assessed. Warranty is void if product is installed or serviced by anyone other than an authorized Air Techniques’ dealer or service personnel.

This warranty is in lieu of all other warranties expressed or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

**ONLINE WARRANTY REGISTRATION**

Quickly and easily register your new Polaris on-line. Just have your product model number and serial number available. Then go to the Air Techniques website, www.airtechniques.com, click the warranty registration link and complete the registration form. This on-line registration ensures a record for the warranty period and helps Air Techniques keep you informed of product updates and other valuable information.
**Manufacturer’s Guidance and Declaration - Electromagnetic Emissions**

The camera is intended to be used within the electromagnetic environment specified below. The user of the camera should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Emissions test</th>
<th>Compliance</th>
<th>Electromagnetic Environment - Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF emissions</td>
<td>Group 1</td>
<td>The camera uses radio-electrical energy only for its internal subsystems. Therefore, it emits very low energy and is not likely to interfere with nearby electronic devices.</td>
</tr>
<tr>
<td>CISPR 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF emissions</td>
<td>Class A</td>
<td>The camera is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes, provided that the following warning is heeded:</td>
</tr>
<tr>
<td>CISPR 11</td>
<td></td>
<td><strong>Warning:</strong> This equipment is intended for use by healthcare professionals only. This equipment may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as reorienting or relocating the camera or shielding the location.</td>
</tr>
<tr>
<td>Harmonic emissions</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>EN 61000-3-2</td>
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<tr>
<td>Voltage fluctuations/flicker</td>
<td>Complies</td>
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<tr>
<td>EN 61000-3-3</td>
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</table>

APPENDIX A - EMC DATA

Electromagnetic Compatibility (EMC) Compliance Information

The camera was tested with a UL ITE compliant 100-240VAC 50/60Hz mains powered computer and was found to comply with the IEC 60601-1-2 standard for electromagnetic compatibility. The camera needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided below.

- Portable and mobile RF communications equipment can affect camera operation.
- Use of accessories or cables other than those specified or provided by Air Techniques may result in increased camera emissions and decreased camera immunity.
- The camera should not be used adjacent to or stacked with other equipment that may interfere with proper camera operation.
Manufacturer’s Guidance and Declaration - Electromagnetic Immunity

The camera is intended to be used within the electromagnetic environment specified below. The user of the camera should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity Test</th>
<th>IEC 60601 Test Level</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment - Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic Discharge (ESD)</td>
<td>± 6kV contact</td>
<td>± 6kV</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.</td>
</tr>
<tr>
<td>IEC 61000-4-2</td>
<td>± 8kV air</td>
<td>± 8kV</td>
<td></td>
</tr>
<tr>
<td>Electrical fast transient/burst</td>
<td>± 2 kV for power supply lines</td>
<td>± 2kV</td>
<td>Mains power quality should be that of typical commercial or hospital environment.</td>
</tr>
<tr>
<td>IEC 61000-4-4</td>
<td>± 1 kV for input/output lines</td>
<td>± 1kV</td>
<td></td>
</tr>
<tr>
<td>Surge</td>
<td>± 1 kV line(s) to line(s)</td>
<td>± 1kV</td>
<td>Mains power quality should be that of typical commercial or hospital environment.</td>
</tr>
<tr>
<td>IEC 61000-4-5</td>
<td>± 2 kV line(s) to earth</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Voltage dips, short interruptions and voltage variations on power supply input lines</td>
<td>&lt;5% Ur (&gt;95% dip in Ur) for 0.5 cycle</td>
<td>&lt;5% Ur - 10ms</td>
<td>Mains power quality should be that of typical commercial or hospital environment.</td>
</tr>
<tr>
<td>IEC 61000-4-11</td>
<td>40% Ur (60% dip in Ur) for 5 cycles</td>
<td>40% Ur - 100ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70% Ur (30% dip in Ur) for 25 cycles</td>
<td>70% Ur - 500ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;5% Ur (&gt;95% dip in Ur) for 5 s</td>
<td>&lt;5% Ur - 5 s</td>
<td>If the user of the camera requires continuous operation during power mains interruptions in the main power supply, it is recommended that the camera be powered from an uninterruptible power supply providing emergency power.</td>
</tr>
<tr>
<td>Power frequency (50/60Hz) magnetic field</td>
<td>3 A/m</td>
<td>3A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location within a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>IEC 61000-4-8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Ur is the a. c. mains voltage prior to application of the test level.
The camera is intended to be used in the electromagnetic environment specified below. The user of the camera should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity Test</th>
<th>IEC 60601 Level</th>
<th>Compliance Level</th>
<th>Electromagnetic Environment - Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF</td>
<td>3 V rms</td>
<td>3 V</td>
<td>Portable and mobile RF communication equipment should be used no closer to any part of the camera, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance:</td>
</tr>
<tr>
<td>IEC 61000-4-6</td>
<td>150 kHz to 80 MHz</td>
<td>d=1,16 √P</td>
<td></td>
</tr>
<tr>
<td>Radiated RF</td>
<td>3 V/m</td>
<td>3 V/m</td>
<td>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, a should be less than the compliance level in each frequency b.</td>
</tr>
<tr>
<td>IEC 61000-4-3</td>
<td>80 MHz to 2.5 GHz</td>
<td>d=1,16 √P 80 MHz to 800 MHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>d=2,33 √P 800 MHz to 2.5 GHz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>d=3,54 √P 2.5 GHz to 10 GHz</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: At 800 MHz, the higher frequency range applies.

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

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

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.
The camera is intended for use in an electromagnetic environment in which radiated RF interferences are controlled. The user of the camera can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the camera such as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Maximum assigned output power of the transmitter W</th>
<th>150 kHz to 80 MHz</th>
<th>80 MHz to 800 MHz</th>
<th>800 MHz to 2.5 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d=1,16 √P</td>
<td>d=1,16 √P</td>
<td>d=2,33 √P</td>
</tr>
<tr>
<td>0.01</td>
<td>0.116</td>
<td>0.116</td>
<td>0.233</td>
</tr>
<tr>
<td>0.1</td>
<td>0.366</td>
<td>0.366</td>
<td>0.736</td>
</tr>
<tr>
<td>1</td>
<td>1.16</td>
<td>1.16</td>
<td>2.33</td>
</tr>
<tr>
<td>10</td>
<td>3.66</td>
<td>—</td>
<td>3.66</td>
</tr>
<tr>
<td>100</td>
<td>11.6</td>
<td>11.6</td>
<td>23.3</td>
</tr>
</tbody>
</table>

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

**Note 1:** At 80 and 800 MHz, the higher frequency range applies.

**Note 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
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  - Intraoral Camera
  - Caries Detection Aid
  - Intraoral X-ray
  - Film Processors

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  - Wet Vacuums
  - Air Compressors
  - Amalgam Separator
  - Utility Accessories
  - Utility Packages

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  - Enzymatic Cleaner
  - Hand Sanitizer and Lotion
  - Waterline Cleaner
  - Evacuation System Cleaner
  - Imaging Accessories
  - Chemistry
  - Processor Accessories

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