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Installation Guidelines

Introduction

The following sections detail the system and installation guidelines for using the SPOT RT camera and software. They are as follows:

- System Requirements
- What is in the Box
- Installing the Software
- Installing the Hardware
- Multiple Camera Installations
- Using SPOT On-line Documentation

<p style="text-align:center">💣WARNING💣</p>

There are no user serviceable parts in the SPOT camera or power supply with the exception of the power supply fuse. Make sure to disconnect the power supply from the electrical power source and from the camera prior to attempting to change the fuse. Failure to do so could result in damage to the camera or power supply and may pose an electrical shock hazard to the user.

Only use the proper fuse as indicated on the power supply label. Failure to comply with this instruction may pose a fire hazard and danger to the user.

The user is strongly advised to protect the camera and the power supply to avoid the entry of any small object or liquids into the camera casing through the camera or power supply openings either while the camera system is in place or during movement from one location to another. Do not spill liquids on, allow small objects into the camera or power supply casing, or immerse the camera or power supply in liquids. Failure to comply with this instruction may pose an electrical shock hazard to the user.

System Requirements

The following sections detail the minimum hardware and software requirements needed for the SPOT camera and associated software. These requirements are valid at the time of your camera purchase and may change with future development of our camera and software products as well as the computers to which they interface. For optimal system suggestions, please consult our website at www.diaginc.com for the timeliest information.

> ✎ *Note: For the most up-to-date suggestions on an optimal computer system configuration, please consult our website at www.diaginc.com*

Equipment Standards - Windows

	Minimum
Processor	Pentium, 400 MHz
Video Card	A card that supports 24 bit, true color at the desired resolution with a refresh rate above 70 Hz.

With some video cards, you might experience system crashes or display problems in live image mode; you might also experience display problems when zooming in on captured images. To correct these problems, lower the Graphics Acceleration setting in Windows, as described in the "Video Card Related Problems" section below.

RAM	256 Mb
Operating System	Windows 98/98SE/2000/ME/XP
	Windows 95 and NT are not supported for the RT Camera System
Monitor	Any color monitor with at least 800 x 600 pixel resolution at 24 bit RGB, and a refresh rate over 70 Hz.
Printer	Driver required for reports feature
Recommended Web Browser	Internet Explorer 5.0 or greater
PCI Card Slot	One available PCI slot
PCMCIA Cardbus Adapter with Optional Magma Adapter (for laptop)	One available PCMCIA Cardbus slot

Equipment Standards - Mac

	Minimum
Processor	400 MHz G3 PowerPC
Video Memory/ Card	Enough video memory on either the mother board or a plug in video card to display millions of colors at the desired resolution, and with a refresh rate above 70 Hz
RAM	256 Mb
PCI	One available PCI slot
Monitor	Any color monitor with at least 800 x 600 pixel resolution at 24-bit RGB, and a refresh rate over 70 Hz.
Operating System	Mac OS10.2.8 or greater
Printer	Driver required for reports feature
Image Editing Software (optional)	The SPOT 3rd Party Interface, which is included with Mac software, is a stand-alone mini-application designed for Mac users who want to use the SPOT camera to capture images, and then edit the images in another imaging application. Some commonly used third party applications include: • Adobe Photoshop • Image Pro Plus • Color It The image editing software used with the SPOT 3rd Party Interface does not need to be TWAIN compliant. Refer to the software manual for more information.

Equipment Standards - General

Additional Hardware and Software	
Coupler	SPOT cameras are manufactured with either a C mount or F-Mount configuration. Check your camera style prior to selecting a coupler.
Light Source	Because the SPOT camera is capable of extremely short exposure times, light sources whose intensity varies with the waveform of the 60 Hz line supply should be avoided. Problem light sources include fluorescent lamps, 120 volt incandescent bulbs, and 6 volt 20 watt halogen lamps. These light sources cause the Live Image window to flicker and result in incorrect brightness and color balance readings in captured images. We have found that the low voltage halogen/xenon lamps used on most microscopes work well, as do the mercury burners used on fluorescence illuminators.
	If your work requires you to use a light source that causes problems, you can use the Minimum Exposure option on the Image Setup window to avoid flicker and give you correct brightness and color balance readings.

What is in the Box

In addition to this hardware guide, the shipping box should contain the following items:

- Camera head with a dust cap
- Power supply (with cable to camera)
- Power cord for the power supply
- Spot Software User Guide
- Universal PCI interface board
- Cable to connect the power supply to the camera
- Cable to connect the interface board to the camera
- Grounding wrist strap
- One CD-R that contains:
  - The software required to operate the SPOT camera.
  - A PDF (portable document format) version of the software and hardware guides.
  - The Adobe Acrobat Reader software that is required to read and/or print the user's manual. Refer to "Using SPOT On-line Documentation" below for instructions on installing the Reader on your computer.
- A registration card (you may also register online at www.diaginc.com)
- 2 year limited warranty

Installing the Software

The CD disk provided with your RT camera contains the SPOT 4.6 PC software, which can be used with Windows 98/98SE (second edition)/2000/ME/XP, and the SPOT 4.5.9 Mac software, which can be used with Mac OS10.2.8 or higher.

Windows Installation

1. Ensure that all other application programs are closed. Windows 2000 and XP users should also ensure that they are logged on with administrator privileges.

2.   Insert the disk into your CD drive. The SPOT Setup window will appear, welcoming you to the Install Wizard for SPOT Setup.

3.   Click Next to continue. The license agreement will appear. After you read and review the license agreement, check the box to accept the license agreement.

4.   Click Next to continue. The installer will then prompt you to choose your preferred type of installation. Choose Complete Setup to install all of the program features. This is the recommended selection for most users. Choose Minimum Setup to install all of the program features but not the example database or sample report. Choose Personalized Setup if you would like to select which program features to install. Make your installation type selection. Click Next to continue.

If you selected Complete or Minimum Setup, follow the steps below to continue the installation:

1.   Select the folder where you would like to install the application.

2.   Click Next to continue and select the Start Menu group for the application. This will be displayed in the Windows Start Menu after the installation is finished. Select 'Create Desktop Shortcuts' if you would like to have shortcuts on your desktop. Choose to create shortcuts for all users or just yourself by selecting 'All Users' or 'Just Me'.

3.   Click Next to continue. The installer will then prepare and finish the installation. A dialogue box will appear that says 'Spot has been installed successfully'. If you have already installed the hardware, and would like to run the Basic mode of the software now, select the checkbox next to 'Run SPOT now' and choose Finish. If you have the hardware installed and would like to run the Advanced mode of the software now, select the checkboxes next to 'Run SPOT now' and 'Advanced Mode', and then select Finish. If you have not yet installed the hardware, de-select 'Run SPOT now', choose Finish, and then proceed to install the hardware as described later in this manual.

If you selected Personalized Setup, follow the steps below to continue the installation:

1.   The Select Features dialogue box will come up, prompting you to select the program features you would like installed. This can be done by choosing the hard drive symbol next to each feature. When the hard drive symbol is selected, a hidden menu will appear. To choose to install the feature, select 'Will be installed on local hard drive'. To prevent the feature from being installed, select 'Entire feature will be disabled'.

2.   Click Next to continue. Select the folder where you would like to install the application.

3.   Click Next to continue and select the Start Menu group for the application. This will be displayed in the Windows Start Menu after the installation is finished. Select 'Create Desktop Shortcuts' if you would like to have shortcuts on your desktop. Choose to create shortcuts for all users or just yourself by selecting 'All Users' or 'Just Me'.

4.   Click Next to continue. The installer will then prepare and finish the installation. A dialogue box will appear that says 'Spot has been installed successfully'. If you have already installed the hardware, and would like to run the Basic mode of the software now, select the checkbox next to 'Run SPOT now' and choose Finish. If you have the hardware installed and would like to run the Advanced mode of the software now, select the checkboxes next to 'Run SPOT now' and 'Advanced Mode', and then select Finish. If you have not yet installed the hardware, de-select 'Run SPOT now', choose Finish, and then proceed to install the hardware as described later in this manual.

Video Card Related Problems (Windows)

Diagnostic Instruments has found that when the graphics acceleration is set too high on certain video cards, the SPOT program can crash when using the Live Image feature or the Live Image can be corrupted. If you

experience this problem, change the Graphics Acceleration in Windows to a lower setting. Follow these steps:

1. From the **Start** menu button, select **Settings > Control Panel**.

2. Double click on the **Display** icon,

3. Click on the **Settings** tab.

4. Click on the **Advanced** button.

5. Click on the **Performance** tab.

6. Change the **Hardware Acceleration** setting by moving the slider to a lower setting. With some cards, you might have to move the slider to the lowest setting in order for live imaging to work.

7. Click on **Apply**.

8. Click on **OK**.

9. Click on **Close**.

Mac Installation

The CD disk provided with your camera contains the SPOT software, which can be used with Mac OS10.1 or higher. *Ensure that you have an administrator password* **BEFORE BEGINNING THE INSTALLATION.**

To install the SPOT software on a Mac, follow the steps listed below.

1. Insert the disk into your CD drive.
2. Double click on the installer icon.
3. Enter the Administrator User Name and Password
4. Click on **Continue**. The Spot Installer window appears.
5. Select the installation location for the program.
6. Click on **Install**. The Installing progress indicator appears.
7. When the installation is complete, you may be notified that the computer will restart.

Installing the Hardware

> *Note: Although the SPOT software can be installed either before or after installing the PCI card, Diagnostic Instruments recommends installing the software first.*

There are three simple steps to installing the hardware:

• Install the PCI card

• Connect the camera to the microscope

• Connect the PCI cable and power supply cable to the camera and to the appropriate computer or electrical interface

♠☀WARNING♠☀

> This (the SPOT camera) is a Class A Product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Installing the PCI Card

To install the PCI plug-in card (board), follow these steps:

CAUTION!

If you are unfamiliar with the procedures for installing plug in boards, refer the installation to your MIS department or to a qualified computer technician.

1. Turn off the computer, and let it sit for a few minutes to let the power supply drain.

2. Unplug all cables, and remove the power cord from the back of the computer.

☀WARNING☀

TO AVOID ELECTRICAL SHOCK, ALWAYS REMOVE THE POWER CORD AND ALL EXTERNAL CABLES, AND WAIT A FEW MINUTES FOR THE POWER SUPPLY TO DRAIN BEFORE OPENING THE CASE.

3. Place the computer on a clean, uncluttered surface, and remove the cover.

4. Position the computer so that the motherboard is facing you.

☀WARNING☀

DO NOT HANDLE THE PCI INTERFACE BOARD OR TOUCH COMPONENTS INSIDE THE COMPUTER WITHOUT USING THE ENCLOSED GROUNDING WRIST STRAP.

5. To discharge any static charge that might have built up on your body, touch your finger to the metal case of the computer's power supply.

6. Stick the copper foil end of the grounding wrist strap to the metal case of the computer's power supply.

7. Loop the other end of the strap around your wrist by pressing the sticky side against the strap, keeping the dark strip against your skin.

8. Use your computer's manual to identify the location of the PCI slot(s) on the motherboard.

9. Remove the metal cover plate adjacent to an available PCI slot. Save the screw.

> *Note: PC users should avoid installing the PCI card in the shared slot (i.e., the PCI slot next to the first ISA slot.*

10. Carefully insert the PCI bus interface board into the PCI slot.

11. Secure the metal bracket back into place with the screw from step nine.

12. Put the cover back on the computer.

13. Reboot the computer.

Connecting the Camera to the Microscope and to the Computer

Your SPOT camera may utilize a C-mount or an F-mount lens adapter. Consult your authorized SPOT dealer or call Diagnostic Instruments for assistance in selecting the appropriate coupler for your Camera/Microscope combination.

To attach the **camera to the microscope**, follow these steps:

1. Attach the bottom clamp to the coupler.
2. Connect the camera to coupler/bottom clamp.
3. Insert the camera/coupler/bottom clamp combination into the microscope's photoport or phototube.
4. Tighten the thumbscrew on the microscope's phototube (or the coupler's bottom clamp) to lock the combination to the microscope.

To connect the **camera to your computer and power supply**, follow these steps:

1. Attach one end of the PCI cable to the PCI Card port on the computer (see PCI card installation below), and attach the other end to the camera head.

2. Attach the power supply cable to the camera head and the other end to the power supply.

3. Plug one end of the power cord into the power supply and the other end into a surge protector.

Multiple Camera Installations

More than one SPOT camera can be operated from a single computer, provided adequate hardware and ports are available. Any combination of SPOT cameras can be used.

Using the SPOT On-line Documentation

To use the on-line documentation that accompanies your SPOT camera, you must first install the Acrobat Reader software that is included on the CD. This software enables you to read and/or print the Portable Document Format (PDF) version of the software and hardware guides that are on your CD.

Specifications

RT-KE Series Cameras

Camera and Filter
RT-KE B/W – Monochrome with and w/o IR filter
RT-KE Color Mosaic – Color mosaic CCD
RT-KE 3-Shot Color – Fixed liquid crystal color filter
RT-KE Slider – Slide mounted liquid crystal color filter

CCD Information
RT-KE B/W – KAI 2001M Monochrome
RT-KE Color Mosaic– KAI 2001CM
RT-KE 3-Shot Color– KAI 2001M Monochrome
RT-KE Slider – KAI 2001M Monochrome

Imaging Area – 11.8mm x 8.9mm
Active Pixels – 1600 x 1200 (1.92 million)
7.4 μm square pixels

RT-KE Color Mosaic Image Resolution
Live image – 800 x 600
Captured image – 1600 x1200

RT-KE 3-Shot Color Image Resolution
Live image – 1600 x 1200
Captured image – 1600 x1200

RT-KE B/W Image Resolution
Live image – 1600 x 1200
Captured image – 1600 x1200

Bit Depth – RT-KE Color Mosaic, RT KE 3-Shot Color
Sampled at 36 bit RGB
Saved file formats: 24 bit, 36 bit, or 48 bit (RGB)

Bit Depth – RT-KE B/W
Sampled at 12 bit monochrome
Saved file formats: 8 bit, 12 bit, or 16 bit (mono)

Cooling
-46 C from ambient via thermoelectric cooler

Pixel Readout Rate
Live images – 36 MHz (2 channel x 18 MHz)
Captured images – 6 MHz (1 channel x 6 MHz)

A/D Converter Full Scale Setting
31,500e (when gain = 1)

Anti – Blooming Factor
300 times (nominal); 100 times (minimum)

Exposure
Automatic and User-Defined
Range – 0.04 ms – 536 seconds

External Shutter Control
BNC, TTL level output

Weight
RT-KE, Monochrome and Color Mosaic - Camera – 3.4 lbs., Power supply – 3.3 lbs.
RT-KE, 3-Shot, RT-KE Slider - Camera – 3.5 lbs., Power supply – 3.3 lbs.

Power Requirements
100 –240 VAC, 47 – 63 Hz

RT-SE Series Cameras

Camera and Filter
RT-SE 6 – Monochrome with and w/o IR filter
RT-SE 6 Slider – Slide mounted liquid crystal color filter
RT-SE 18 – Monochrome with and w/o IR filter

CCD Information
RT-SE6 B/W – ICX-285AL Monochrome
RT-SE6 Slider– ICX-285AL Monochrome
RT-SE18 B/W– ICX-285AL Monochrome

Imaging Area – 8.77mm x 6.60mm
Active Pixels – 1360 x 1024 (1.92 million)
6.45 μm square pixels

RT-SE6 Slider Image Resolution
Live image – 1600 x 1200
Captured image – 1600 x1200

RT-SE6 B/W, RT-SE18 B/W Image Resolution
Live image – 1600 x 1200
Captured image – 1600 x1200

Bit Depth – RT-SE6 Slider
Sampled at 36 bit RGB
Saved file formats: 24 bit, 36 bit, or 48 bit (RGB)

Bit Depth – RT-SE6 B/W
Sampled at 12 bit monochrome
Saved file formats: 8 bit, 12 bit, or 16 bit (mono)

Bit Depth – RT-SE18 B/W
Sampled at 10 bit monochrome
Saved file formats: 8 bit, 12 bit, or 16 bit (mono)

Cooling
-48 C from ambient via thermoelectric cooler

Pixel Readout Rate- RT-SE6 Slider, RT-SE6 B/W
Live images – 18 MHz (1 channel x 18 MHz)
Captured images – 6 MHz (1 channel x 6 MHz)

Pixel Readout Rate- RT-SE18 B/W
Live images – 18 MHz (1 channel x 18 MHz)
Captured images – 18 MHz (1 channel x 6 MHz)

A/D Converter Full Scale Setting
14,500e (when gain = 1)

Anti – Blooming Factor
300 times (nominal); 100 times (minimum)

Exposure
Automatic and User-Defined
Range – 0.04 ms – 536 seconds

External Shutter Control
BNC, TTL level output

Weight
RT-SE 6 Slider - Camera – 3.5 lbs., Power supply - 3.3 lbs.
RT-SE6 B/W, RT-SE18 - Camera - 1.4 lbs., Power supply – 3.3lbs.

Power Requirements

100 –240 VAC, 47 – 63 Hz

Certifications
CE, FCC, Class A, EN 60950

Minimum Computer Requirements

PC* - Pentium 400 MHz, 256 MB RAM, Firewire (IEEE1394a) interface, Windows 98SE/2000/ME/XP

Mac* – Power PC 400 MHz G3, 256 MB RAM, PCI interface, Mac OS 10.2.8 or greater

Video card – Support of 24 bit RGB at the desired resolution.

Software Features
- Live image window
- Image capture window
- Pre-defined image types
- Auto exposure
- Auto white balance
- Bias Frame, Thermal Frame and Flatfield correction
- Zoom and pan window
- Image enhancement tools
- Non-destructive Annotation and Calibration mark
- Measurement – length, perimeter area, angle
- Print layout dialog
- On-line help menu
- Macro Scripting
- "Floating" Taskbar
- Image archiving database with export feature
- Report generator
- Sequential image capture and playback
- Correct Color Technology

Image File Formats

TIFF, TIFF-JPEG, JPEG, Bitmap, PICT, AVI (PC, export only) QuickTime (Mac, export only), JPEG2000

File Size

RT-KE 3-Shot Color, Slider, Color Mosaic, B/W	RT-SE6 Slider, B/W, RT-SE18 B/W
24 bit - 5.49 MB/8 bit - 1.83 MB	24 bit – 3.99 MB/8 bit - 1.33 MB
36 bit - 8.24 MB/12 bit - 2.75 MB	36 bit – 6.00 MB/12 bit - 2.00 MB
48 bit – 10.99 MB/16 bit - 3.66 MB	48 bit – 7.98 MB/16 bit - 2.66 MB

Drivers

TWAIN for Windows supported Windows® Operating Systems;
Apple Event for supported Mac® Operating Systems

Couplers

RT-KE Monochrome, RT-KE Monochrome w/IR, RT-KE Color Mosaic: D10XXC (1.0x), HRU060-CMT (0.60x) and bottom clamp, HRD100-CMT (1.0x) and bottom clamp, all available from Diagnostic Instruments

RT-KE 3-Shot Color, RT-KE Slider: D10XXF (1.0x), HRU060-NIK (0.60x) and bottom clamp, HRD100-NIK (1.0x) and bottom clamp; all available from Diagnostic Instruments

RT-SE6 Monochrome, RT-SE6 Monochrome w/IR, RT-SE18 Monochrome, RT-SE18 Monochrome w/IR: D10XXC (1.0x), HRD076-CMT (0.76 x) and bottom clamp, all available from Diagnostic Instruments
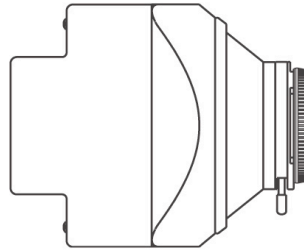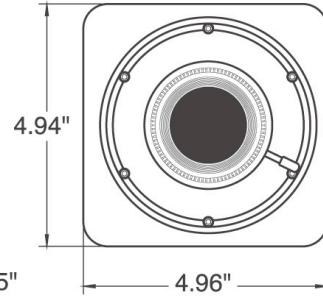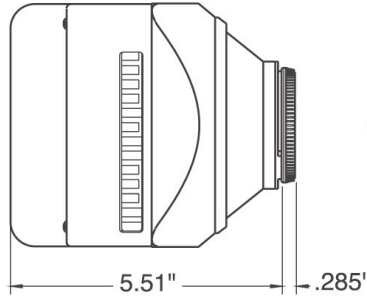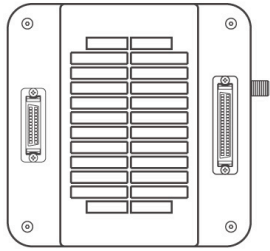
RT-SE6 Slider: D10XXF (1.0x), HRD076-NIK (0.76x) and bottom clamp; all available from Diagnostic Instruments
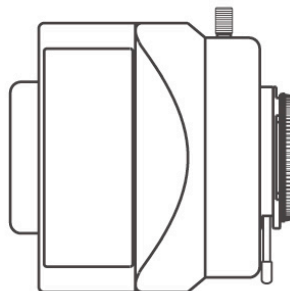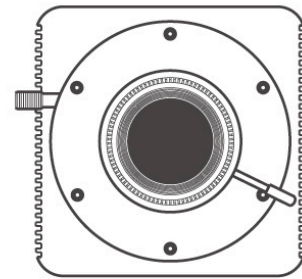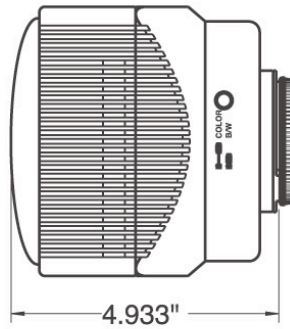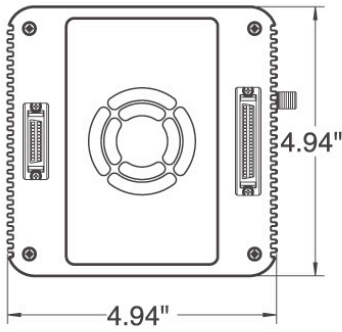
Lens & Mounting

RT Monochrome, Mono w/IR, Color Mosaic - C- Mount lens for 1" format CCD, Flange to rear lens clearance - 0.46" (11.7 mm) max.

RT 3-Shot Color, RT Slider - F- Mount lens for 1" format CCD, Flange to rear lens clearance - 0.43" (10.8 mm) max.
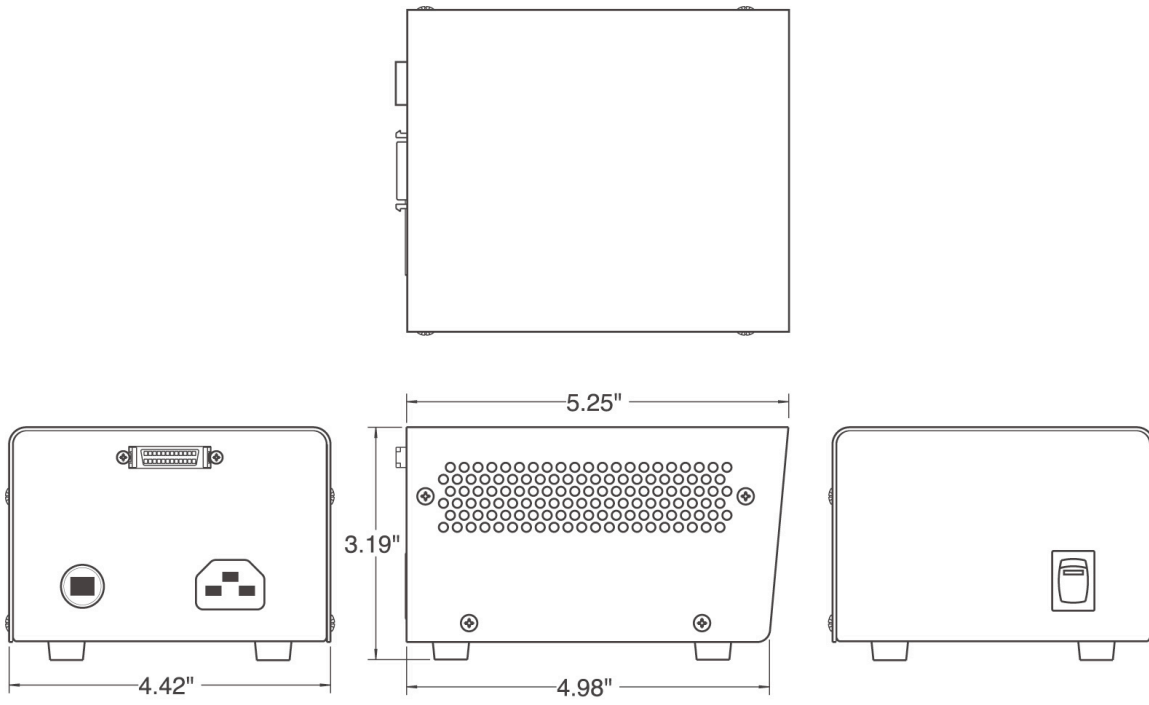
Camera Dimensions

4.94"

5.51" .285" 4.96"

**RT KE/SE 3-Shot,
RT KE/SE Slider**

4.94"

4.94" 4.933"

**RT KE/SE
Monochrome, RT KE
Color Mosaic**

Power Supply Dimensions

FCC "Class A" Product Warning

All SPOT cameras fall into the Class A category of the FCC (Federal Communications Commission) emission standard EN55022/CISPR22. The following is the FCC's standard warning for this type of device:

WARNING:
This is a Class A Product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.