Spectral DEVICES INC.

MULTISPECTRAL SNAPSHOT CAMERAS

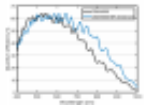
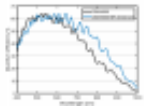
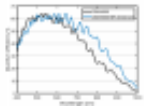
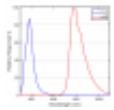
Spectral Devices multispectral snapshot cameras incorporate CMOS sensors with high performance multispectral filter array technology. Capture multiple spectral images simultaneously with each camera exposure. Capture multispectral video at up to 90 FPS. Industry leading selection of multispectral camera models optimized for standard and custom imaging applications. Global shutter provides accurate high-speed imaging of fast moving objects. USB3 Vision and GenICam-compliance makes these cameras easy to setup and use. The enclosure is CNC-machined from aluminium for strength and hard anodized for durability. We carry lenses from major manufacturers and can recommend a lens that is optimized for even the most difficult imaging task. The cameras are compatible with a wide selection of software and SDKs for Windows, Linux, and National Instruments LabVIEW.

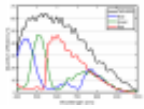
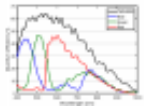
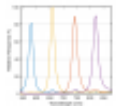
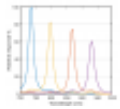
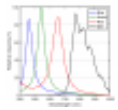
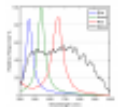
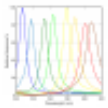
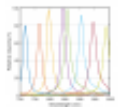
Snapshot Operation | **Capture All Bands Simultaneously** | **Global Shutter CMOS Sensor** | **High Frame Rate**

High Dynamic Range | **USB3 Vision and GenICam compliant** | **Small, Lightweight and Rugged** | **Flexible Mounting Options**

External Triggering | **External Strobing**

CAMERA MODELS

PRODUCT	#BANDS	BANDS (nm)	PIXELS/BAND	RESPONSE	VIDEOS/IMAGES	PART#	DATA SHEET	QUOTE REQUEST
4.2MP Mono	1	400-1000	2048 x 2048			MSC-M42-1-A		Add to quote
2.2MP Mono	1	400-1000	2048x1088			MSC-M22-1-A		Add to quote
4.2MP Mono NIR-enhanced	1	400-1000	2048 X 2048			MSC-MN42-1-A		Add to quote
UV-NIR	2	400, 800	1024 x 512		Examples	MSC-UN-1-A		Add to quote

2.2MP Color	3	400-700	2048 X 1088			MSC-C22-1-A	Add to quote
4.2MP Color	3	440, 520, 600	2048 x 2048			MSC-C42-1-A	Add to quote
Agriculture	4	580, 660, 735, 820	512 x 512		Examples	MSC-AGRI-1-A	Add to quote
Biomedical	4	735, 800, 865, 930	512 x 512		Examples	MSC-BIO-1-A	Add to quote
Red-Green-Blue-NIR	4	450, 550, 650, 800	1024x1024 (color), 512x512 (NIR)		Examples	MSC-RGBN-1-A	Add to quote
Red-Green-Blue-Mono	4	450, 550, 650, 400-1000	1024x1024 (color), 512x512 (mono)			MSC-RGBM-1-A	Add to quote
8-Band Visible	8	474, 495, 526, 546, 578, 597, 621, 640	256 x 256		Examples	MSC-VIS8-1-A	Add to quote
8-Band NIR	8	720, 760, 800, 840, 860, 900, 940, 980	256 x 256		Examples	MSC-NIR8-1-A	Add to quote
4-Band	4	User-Defined	512 x 512		Examples	MSC-CUS4-	Add to quote

Custom				1-A	
8-Band Custom	8	User-Defined	256 x 256	MSC-CUS8-1-A	Add to quote
9-Band Custom	9	User-Defined	341 x 341	MSC-CUS9-1-A	Add to quote
16-Band Custom	16	User-Defined	256x256	MSC-CUS16-1-A	Add to quote

SPECIFICATIONS

SENSOR

Model: CMV4000

Type: CMOS Global Shutter

Exposure: 100 µs (minimum)

Pixel Size: 5.5 µm X 5.5 µm

Dynamic Range: 60 dB

Dark Noise: 13 e- (RMS)

Dark Current: 125 e-/s (25 deg. C)

ELECTRONICS

Digitization: 12 bits

Interface: USB3 Vision

Power: USB3 (no external power required)

USB Connector: USB 3.0 Micro-B (screw)

I/O: 1 Trigger in, 2 Strobe out (opto-isolated)

I/O Connector: 12-pin Hirose HR10A

MECHANICAL

Lens Mount: c-mount

Size: 56 mm x 50 mm X 52 mm (W X H X D)

Weight: 204 g

Finish: Anodized Black, Laser Etched

Case Material: 6061 Aluminium (CNC)

Imperial Mounts: 12 x ¼-20 (5 mm deep)

Metric Mounts: 12 x M3 (5 mm deep)

Front Mounts: 4 x 4-40 (30 mm cage compatible)

DESCRIPTION

RGB-NIR CAMERA

Our multispectral camera with RGB and NIR bands has conventional red, green, and blue bands of spectral transmission, and also contains a NIR channel, which is sensitive to near infrared light from 750 nm to 1000 nm. The camera is a high performance alternative to standard color cameras, since the amount of cross-talk between bands is much lower, especially between the NIR channel and the color channels. The camera is useful for a variety of applications where color and NIR imaging must be performed simultaneously.

AGRICULTURE CAMERA

Our multispectral camera for precision agriculture is useful for agricultural applications where measurements on vegetation are performed. It offers multispectral imaging at 4 bands: (i) 580 nm is sensitive to live vegetation; (ii) 660 nm is sensitive to the NDVI red channel; (iii) 735 nm is sensitive to the 'red edge' channel; and (iv) 820 nm is sensitive to the NDVI NIR channel. With these four images a number of spectral analyses can be performed, including NDVI and SAVI.

BIOMEDICAL CAMERA

Our multispectral camera for biomedical research has 4 bands of spectral discrimination. The first band (735 nm) is sensitive to deoxyhemoglobin (deoxygenated blood). The second band (800 nm) is sensitive to total hemoglobin (total blood). The third band (865 nm) is sensitive to oxyhemoglobin (oxygenated blood). The fourth band (930 nm) is sensitive to lipid. With these four images a number of analysis can be performed including oxygen saturation and total hemoglobin which are important for monitoring tissue health. Note: the multispectral camera for biomedical research is to be used for investigational purposes only.

UV-NIR CAMERA

Our UV-NIR multispectral camera has 2 bands of spectral discrimination. One band is centered in the UV region covering 350 to 450 nm and the other covers the near infrared region between 700 and 1000 nm. The camera is useful for horticultural applications such as visualizing hidden features in flowers. It is also useful for detecting hidden skin defects and measuring the coverage of lotions such as sun screen products.

RGB-MONO CAMERA

Our multispectral camera with RGB and mono bands has conventional red, green, and blue bands of spectral transmission, and also contains a panchromatic channel, which is sensitive to the full spectral range from 400 nm to 1000 nm. The camera is useful for a

variety of applications where color and monochrome imaging must be performed simultaneously.

8-BAND CAMERAS

Our 8-band cameras offer nearly equally spaced bands across the visible (8-Band Visible) and the near infrared (8-Band NIR) spectral ranges. These cameras are an excellent choice when more spectral information is needed at the expense of spatial resolution. These cameras offer 3-fold higher sensitivity for each band due the unique filter arrangement on the sensor. These cameras are useful for detailed color testing of paints and inks, spectral analysis of plants, and biomedical research applications were a greater number of bands is needed.

CUSTOM CAMERAS

We offer custom multispectral cameras in configurations of 4, 8, 9, and 16 bands (please see CAMERA MODELS). The selection of the bands is limited only by the filter choice and bands can be manufactured in the UV, through the visible, and into the NIR. Please review the specifications for each filter type on our TECHNOLOGY page. Custom multispectral cameras are manufactured in consultation with the customer to meet the requirements of the customer-specific imaging task. We can deliver a custom camera in as little as 6 weeks. Please contact us for a quotation.

MONOCHROME AND COLOR CAMERAS

Spectral Devices monochrome and color cameras incorporate high performance CMOS sensors. Global shutter provides accurate high-speed imaging of fast moving objects. USB3 Vision and GenICam-compliance makes these cameras easy to setup and use. Cameras are available in color or monochrome format, resolutions of 2.2 or 4.2 megapixels, and with or without near infrared-enhanced sensors. Each camera has external triggering, integrated c-mount, and imperial and metric mounting holes on five sides. We carry high-quality lenses from major manufacturers and can recommend a lens that is optimized for a particular imaging task. The cameras are compatible with a wide selection of software and SDKs for Windows, Linux, and National Instruments LabVIEW.

LENS SELECTION

Since many of our multispectral cameras cover a broad spectral range in a single exposure, lens selection is critical for achieving top performance. We offer a wide range of lenses from reputable manufacturers such as Schneider Optics and Kowa. Send us details of the imaging task and we will recommend a lens and camera that solves your imaging problem.

2NDLOOK FOR WINDOWS

2ndLook is a complete image acquisition software package that enables users to connect and acquire images from one or more cameras on a single PC. Offers real-time synchronized video recording from GenICam-compliant USB3 Vision, GigE Vision, and

DirectShow cameras. Easily record directly to popular file formats such as AVI and TIFF. Record from multiple cameras to different file formats concurrently. Multispectral imaging conversion filters for Spectral Devices cameras are built in. View montage of spectral images in a real-time. View RGB color and NIR images side-by-side. View NDVI images using our Agriculture camera. Easy to use interface with interactive help and user guides.

MSCAPTURE FOR LINUX

msCapture is a Linux-based camera control and image capture application for Spectral Devices Area and Line scan cameras. It enables a user to capture a sequence of frames at very precisely timed intervals. Raw frames can be saved to disk or combined (stacked) into a series of images when a line scan camera is used. msCapture buffers frame data in memory to achieve high frame rates. Camera setup is easily performed using a text-based configuration file. Using msCapture, the camera can be controlled over a network and automated using scripting. msCapture is available for x86 and ARM platforms. We have run msCapture successfully on a variety of devices ranging from Intel-based laptops and workstations down to single board computers such as the BeagleBone Black. Contact us for customization options.

RESOURCES

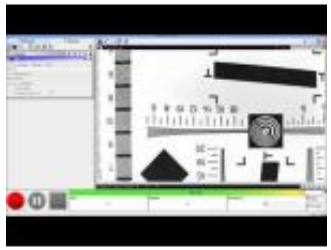
2ndLook Camera Software (32 bit trial version)

2ndlook_setup_32-bit_2.0.4.0.exe

2ndLook Camera Software (64 bit trial version)

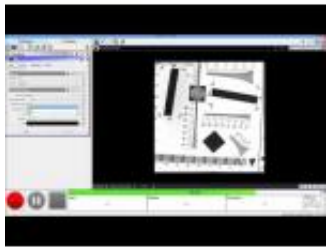
2ndlook_setup_64-bit_2.0.4.0.exe

2ndLook Setup and Imaging



2ndLook Camera Settings

2ndLook Conversion Steps



2ndLook Multi-Camera Imaging