SVBONY

SV405CC
User Manual

CONTENT

EU Importer:
Name: Germany Retevis Technology GmbH
Address: Uetzenacker 29,38176 wendeburg

1.To Customers

Hello, friends! You can download SV405CC User Manual pdf file or print this file. SVBONY has the rights to modify this document without prior notice. Please download the latest version from our official website.

Thanks for purchasing your new SVBONY astronomy camera! This manual will give you a brief introduction of the SV405CC camera. Please read this manual completely before using it. If you have any questions, please feel free to contact us:

Facebook: www.facebook.com/svbony

For software installation instructions and other technical support, please email us: info@svbony.com

2. Package List

① Camera Bag x 1
② SV405CC Astronomy Camera x 1
③ M42 Camera Cap x 1
④ Sponge Washer x 3
⑤ 1.25-inch Camera Cap x 1
⑥ 1.25-inch T-barrel x 1
⑦ M42-M48F-16.5L x 1
⑧ M42-M42F-21L x 1
⑨ T2-1.25-inch Adapter x 1
⑩ User Manual x 1
⑪ Power Adapter x 1
⑫ USB3.0 Data Cable x 1

3. Camera Appearance Introduction

4. Camera Specification

1	Model	SV405CC
2	Sensor	SONY IMX294 CMOS
3	Image Resolution	4144*2822
4	Total Pixels	11.7 megapixel
5	Pixel Size	4.63μm
6	Target Size	19.2mm*13mm
7	Diagonal	23.2mm
8	Maximum Frame Rate	19FPS
9	Shutter Type	Rolling Shutter
10	USB Type	Type-B USB 3.0
11	Cache	DDR3 256M
12	Time of Exposure	0.05ms-2000s
13	Readout Noise	1.2e
14	QE Peak	75%
15	Full Charged	63ke
16	ADC	14bit
17	Temperature Display	Display on software
18	Cooling System	TEC Semiconductor 2-Stage Refrigeration
19	Digital Noise Reduction	Support
20	ROI	Any Resolution Supported
21	Pixel Binning	BIN1,BIN2,BIN3,BIN4
22	Operating System	Windows, Linux, MAC OS, Raspberry Pi
23	Protective Window Optical Glass	AR Coating
24	Camera Interface Specifications	2" / 1.25" / M42X0.75
25	Back Intercept	7.5mm
26	Working Current	<300MA
27	Stand-by Current	<30MA

5. Camera Software Installation Settings

5.1 Camera Driver Installation

1. Driver Download
You can download the latest driver from the SVBONY official website.
https://www.svbony.com/Support/SoftWare-Driver/
2. Install the Windows Driver
①Double-click the driver installation package, select the language, and enter the installation page
②Click install and wait for completion
③Check the driver installation. After the installation is complete, connect the camera to the USB port of the computer via a USB cable, and the camera will automatically recognize it.
④Check the camera status in the device manager
Note: Please do not connect the camera before installing the driver.

5.2 Image Software Installation

1. Installation and Use of Image Software
①Use the Sharpcap software to download the latest version from the sharpcap official website.
②Click install, set the installation path (default), and the installation is complete.
③After the installation is complete, perform a preliminary test. Open the software, find the model of Svbony Camera in the camera drop-down menu and click connect.
④Set the Image storage path.
⑤The introductory operation guide of sharpcap can be viewed in the "Help" option of the software. At the same time, the download of PDF format files is provided under "Documents" on the homepage of sharpcap official website, which can be downloaded and studied.

5.3 Checking of the Image Software
1. Check the frame rate

2. Remove the camera dust cover, adjust the exposure time, and the preview interface will have light and dark changes, indicating that the work is normal.

5.4 Using N.I.N.A
Turn on N.I.N.A. —Nighttime Imaging 'N' Astronomy. Connect via ASCOM driver.
Turn on the refrigerator to set the temperature.

5.3 Checking of the Image Software

1. Check the frame rate
2. Remove the camera dust cover,djust the exposure time, and the preview interface will have light and dark changes, indicating that the work is normal.

5.4 Using N.I.N.A

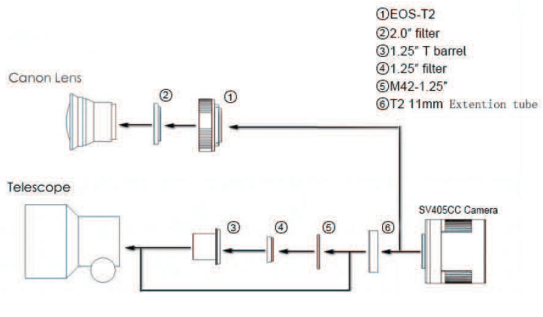
Turn on N.I.N.A. —Nighttime Imaging 'N' Astronomy. Connect via ASCOM driver.Turn on the refrigerator to set the temperature.

Set the exposure time to capture the image.

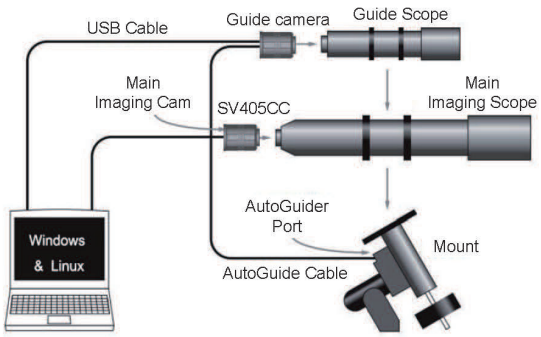
6.How to Use the Camera

SV405CC can be connected to filters, telescopes, or camera lenses through adapters. Most adapters have already included. The rest adapters can be purchased directly from our official website.
Official website link: http://www.svbony.com/

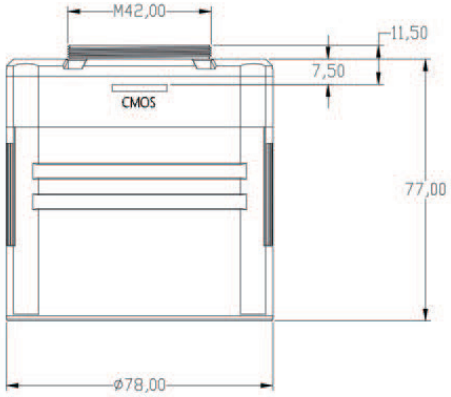
6.1 Accessories Connection Diagram



6.2 Connection Diagram of External Device



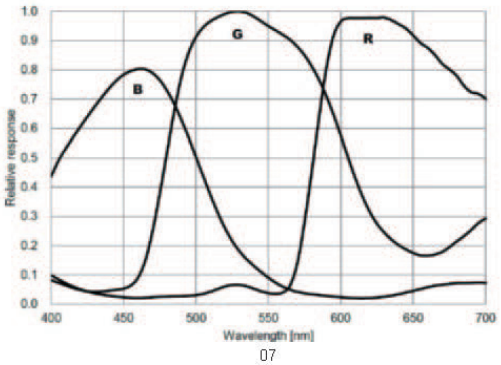
7. Structure Dimension Figure



8. Performance Chart

8.1 QE Curve & Readout Noise

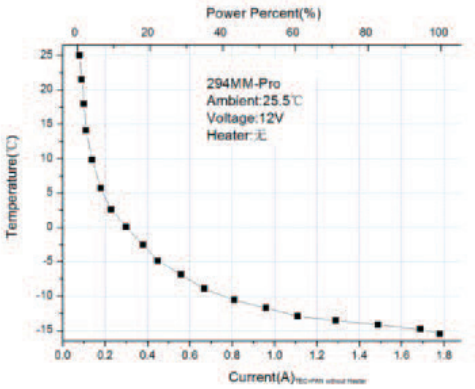
QE curve and readout noise are the most important parameters to measure camera performance. Higher QE and lower readout noise are necessary conditions to improve the image signal-to-noise ratio.



Readout noise includes pixel noise, circuit noise, and ADC quantization noise. The lower the readout noise, the better. As shown in the figure, the readout noise of the SV405CC is very low compared with conventional CCD cameras. Built-in HCG mode, which can effectively reduce readout noise at high gain, so that the camera maintains the same wide dynamic range as at low gain. When the gain is 120, the HCG mode is automatically turned on, the readout noise is as low as 1.2e, and the dynamic range can still reach a level close to 14bit. The parameter settings are also different depending on your shooting target. Turn down the gain, the dynamic range will become larger, suitable for long exposures. Increase the gain, the readout noise will be further reduced, which is suitable for short exposure or lucky imaging.

8.2 Power Consumption

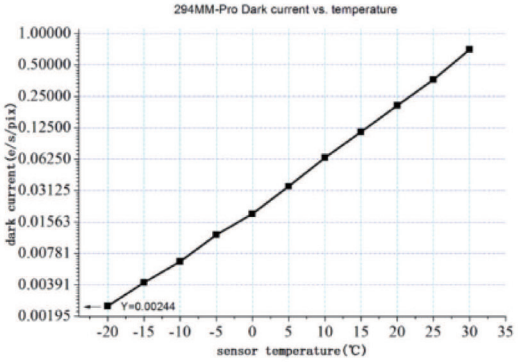
The SV405CC camera is a low-power camera. When the camera is powered by a USB cable, the maximum power consumption is 1.85W. But for cooling function, you need to use a 12V@5A power adapter (D5.5*2. Imm, center positive), or you can use a lithium battery (supports a wide range of 11V to 15V). The picture below is the cooling efficiency diagram of our freezer camera. A cooling temperature difference of 30 degrees only requires a current of 0.5A.



8.3 TEC Cooling System

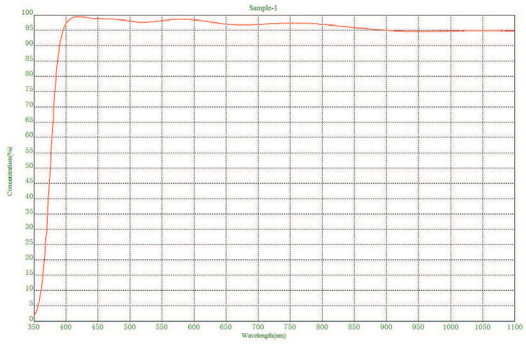
The TEC cooling system of the SV405CC camera can precisely control the temperature of the sensor. Different from the traditional CCD, the SV405CC camera has ultra-low readout noise, efficient cooling and adjustable gain. It is no longer necessary to use ultra-long exposures to capture targets, which greatly reduces the requirements for the camera system and guide star system. However, if short exposures are used (e.g. less than 100ms), cooling has little

effect on the image. The cooling system can be set to a minimum of 35~40°C below the ambient temperature (Tested based on ambient temperature of 30°C). Please note that the maximum temperature difference may fluctuate after pro-longed use. Meanwhile, when the ambient temperature decreases, the cooling temperature difference will also decrease accordingly. The figure below is the dark current curve of the SV405CC sensor between -20°C and 35°C.



8.4 AR Coating Filter

The SV405CC camera sensor is equipped with a protective window and uses an AR coated filter.



9. Other Special Functions

9.1 DDR High-speed Memory

The SV405CC camera has a built-in 256MB (2Gb) DDR3 high-speed memory to buffer image data to ensure stable data transmission. And it can effectively reduce the glow effect caused by slow readout speed.

9.2 Ultra-short Back Intercept

The back intercept of the SV405CC can be shortened to 6.5mm, allowing compatibility with more devices and lenses.

9.3 Pixel Binning

The SV405CC camera supports Bin1, Bin2, Bin3, Bin4 software pixel binning modes.

10. Equipment Care and Maintenance

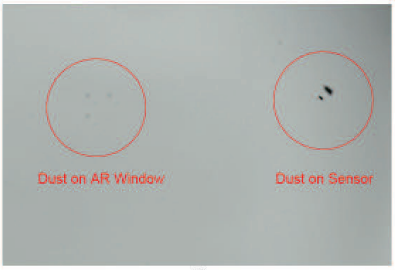
Protect the Refrigerator

Thermal shock should be avoided when using the camera. The so-called thermal shock refers to the internal strong stress that the refrigerator has to bear due to the principle of thermal expansion and contraction when the temperature of the refrigerator suddenly rises or falls. Severe thermal shock can shorten the life of the cooler or even damage it completely. Therefore, when you start using the cooler to adjust the temperature of the CMOS, you should avoid turning on the cooler to maximum power at once. Instead, the power of the cooler should be gradually increased. Before disconnecting the power supply, if the power of the cooler is relatively high, the power of the cooler should be gradually reduced, and then disconnect the power supply.

CMOS Care and Maintenance

Cleaning of CMOS Sensors and Optical Window

If you find dust on the CMOS sensor, you can remove the front half of the camera. Then use the cleaning kit for DSLR camera sensors to clean the CMOS sensor. You must be careful when cleaning it. You can also use a DSLR cleaning tool or lens tissue to clean it. Be careful not to use too much force, because the coating of the CMOS sensor is very fragile and can be scratched easily. The general identification of whether the dust is on the sensor or on the window glass is as follows.



Dry Camera CMOS Chamber
The CMOS sensor is located in the CMOS chamber. There is a hole on the side of the front of the camera. If moisture in the CMOS chamber fogs the sensor glass, you can dry it by connecting a silicone tube through this hole. Please put an effective silica gel desiccant in the silica gel stick and make sure that there is cotton inside to prevent silica gel from entering the CMOS chamber.

Prevent Fogging of Optical Windows in CMOS Sealed Chamber
If the ambient humidity is very high, the optical window of the CMOS sealed chamber may have condensation problems. The camera has a built-in heating plate that heats the sensor to prevent fogging. In most cases, its effect is very noticeable. If the fogging problem persists, please try the following methods:
1. Avoid the camera facing the ground. Cold air is denser than hot air. If the camera is facing down, it will be easier for the cold air to come into contact with the glass and cause it to cool and fog.
2. Increase the temperature of the CMOS sensor. You can raise the temperature of the CMOS sensor a little to prevent glass fogging.
3. Check whether the heating plate is working. If the heating plate is not working, the glass will be very easy to fog up. Under normal circumstances, the temperature of the heating plate can reach 65-70℃ under the environment of 25℃. If it does not reach this temperature, it is possible that the heating plate is damaged and you can contact us to replace the heating plate.

Quality Assurance
The SV405CC camera warranty time is one year. Within warranty period, if the camera fails to function, we will provide free after-sales maintenance service. Besides the warranty days, we provide life-long maintenance services and charge only the parts that need repair or replacement. The buyer will pay for the postage of returning camera to factory to be repaired. Within the warranty period, if the following condition occurs, certain maintenance costs will be charged.
1. The malfunction and damaged caused by incorrect use, the unauthorized repairs and alteration.
2. The damage caused by fire, flood, earthquake, other natural disasters and secondary product damage.
3. The product malfunction caused by the fall and transportation failures after purchase.
4. The malfunction and damaged caused by the other barriers (man-made factors or external device).
5. Purchase without the warranty card and purchase invoices.

Before using this device, read this guide which contains important operating instructions for safe usage and control for compliance with applicable standards and regulations.

FCC Requirements:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and(2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

RF warning for Mobile device:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Before using this device, read this guide which contains important operating instructions for safe usage and control for compliance with applicable standards and regulations.

CE Requirements:

•(Simple EU declaration of conformity) Hong Kong Svbony Technology Co.,Ltd declares that the equipment type is in compliance with the essential requirements and other relevant provisions of RED Directive 2014/30/EU and the ROHS Directive 2011/65/ÆU and the WEEE Directive 2012/19/ÆU; the full text of the EU declaration of conformity is available at the following internet address: www.svbony.com.

•Disposal

The crossed-out wheeled-bin symbol on your product, literature, or packaging reminds you that in the European Union, all electrical and electronic products, batteries, and accumulators (rechargeable batteries) must be taken to designated collection locations at the end of their working life. Do not dispose of these products as unsorted municipal waste. Dispose of them according to the laws in your area.

IC Requirements:

CAN ICES-3(B)/NMB-3(B)

Avoid Choking Hazard

Small Parts. Not for children under 3 years.

Approved Accessories

•This device meets the regulatory standards when used with the Svbony accessories supplied or designated for the product.

•For a list of Svbony-approved accessories for your item, visit the following website: http://www.Svbony.com

Warranty Card

Product Model:	
Purchasing Date:	
Defect Reason:	
Dealer Name:	
Telephone:	
User's Name:	
User's Address:	
User's Email:	

Remarks:
1. This guarantee card should be kept by the user, no replacement if lost.
2. Most new products carry a one-year manufacturer's warranty from the date of purchase.
3. The user can get warranty and after-sales service as below:
• Contact the seller where you buy.
4. For warranty service, you will need to provide a receipt proof of purchase from the actual seller for verification

Exclusions from Warranty Coverage:
1. To any product damaged by accident.
2. In the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs.
3. If the serial number has been altered, defaced, or removed.

CE RoHS

Hong Kong Svbony Technology Co.,Ltd
Add: Unit B, 5th Floor, Gallo Commercial Building, 114-118
Lockhart Road, Wanchai, Hong Kong
Facebook: facebook.com/svbony
E-mail: info@svbony.com
Web: www.svbony.com