INSTRUCTION MANUAL

Orion® StarShoot™ AllSky Camera II

#52191 (NTSC) #52197 (PAL)

ORION®
TELESCOPES & BINOCULARS

Providing Exceptional Consumer Optical Products Since 1975

Customer Support:
www.OrionTelescopes.com/contactus

Corporate Offices:
89 Hangar Way, Watsonville CA 95076 - USA

IN 455 Rev. B 05/14

Figure 1. The Orion StarShoot AllSky Camera II and included items.

Welcome to a new world of adventure. Your new Orion StarShoot AllSky Camera II (SSASCII) is capable of providing 180 degree color views of the night skies from horizon to horizon in real-time. The SSASCII can even be used during the day to take images of daytime skies.

Primarily designed to monitor sky conditions, the SSASCII can also capture meteors, satellites, International Space Station, atmospheric phenomena and much more.

With the included Orion Video Capture device the SSASCII can be used to broadcast your real time images across the internet.

With the included software, cables and adapters the SSASCII can be controlled remotely from your laptop or PC.

The included Orion HandyAVI® special edition software features time-lapse photography, meteor detection and ability to send images via email or FTP images/movie to a website.

The weather proof dome housing makes it possible to permanently mount the SSASCII making it an ideal tool for observatories, schools and home use (mounting options sold separately).

Please read this instruction manual before attempting to use the camera or install the software.

Parts List

- Orion StarShoot AllSky Camera II (SSASCII)
- Allen Key (For Vandal Proof screws)
- 50 ft Dual RCA/Power extension Cable
- 50 ft Serial Cable
- USB to RS-232 Adapter
- BNC/RCA Adapter
- Mains Power Adapter
- Field Battery Power Adapter
- Orion Video Capture device, video adapter cables and Software CD
- Orion HandyAVI® Special Edition software CD
- Orion Video Camera Control software CD

Practical Uses of the All-Sky Camera

Astronomer's Sky Monitor

- Use to check sky conditions at remote locations by broadcasting the real-time views over the internet via email, website and/or online broadcasting services.
- See the Milky Way
- Constellations and planets can be easily identified

Meteor/Satellite Detector

- Automatically detect and capture meteors using the included Orion HandyAVI Special Edition software.
- Images and movies of detected objects can be automatically downloaded to websites via FTP or email.

All-Weather Camera

- Create time-lapse movies of cloud movements
- Image cloud types
- Image storms, lightning, rainbows, sunsets, auroras

Other

- Create a 24 hour time-lapse from dusk until dawn
- Take images at automated times to capture analemma and retrograde movements of the moon and bright planets over long periods of time.
- Take the portable all-sky camera to star parties, air shows, balloon festivals, mountain ranges, cities with landmarks etc. to make interesting time-lapse movies.

Figure 2. TV as a displaying device.

Figure 3. Laptop as a displaying/ capture/broadcasting device.

Viewing Devices

The SSASCII outputs a standard composite video signal that can be displayed or recorded on any device with composite video input such as a TV, Projector, Camcorder, DVR or VCR (**Figure 2**).

Optionally using the included Orion Video Capture Device, camera output can also be viewed and captured on a PC/Laptop **(Figure 3)**. You can even broadcast your views over the internet using the the included Orion Video Capture Device and online broadcasting services. Search the web for “free online video streaming and broadcasting”.

(Read the included Orion Video Capture Device manual for details).

Camera Feature List

- 768 x 494 (NTSC), 752 x 582 (PAL) screen resolution
- 24 bit color
- 30hz Video frame rate (NTSC), 25hz (PAL)
- Computer Controlled via rs-232
- Frame integration for up to 4 seconds exposure (256x Sense up).
- Automatic Gain control.
- Auto Light Control (ALC) shutter speeds from 1/10000 second to 1/100 second.
- Super Digital Noise Reduction virtually eliminates all hot pixels.
- Color Bar display for display calibration and testing of video signal.
- 2X digital zoom feature.
- Customizable Title text display.
- Light & Dark Gamma modes.
- High and Mid sharpness enhancement modes.

- Horizontal and vertical mirror functions.
- Auto white balance mode.
- Wide and Narrow Auto Tracking White Balance (ATW) modes aid in light polluted skies.
- Auto, Color and Black and White day/night modes.

Lens Feature List

- High Quality Fujinon Fish Eye Lens
- Vari-focal (1.4mm->3.1mm) with horizontal field angle of 185-94°
- Wide aperture of f/1.4, optimizing the performance at low lighting intensity
- Built-In ND filter supporting super sensitive cameras
- DC Auto-Iris for day viewing

Housing Feature list

- Weather proof IP66 certified
- Distortion free acrylic dome bubble window
- Heater and fan to prevent fogging of dome bubble cover

Getting Started During Daylight

We recommend using the SSASCII for the first time during the day. This way, you can become familiar with the camera and its functions without having to fumble with controls and settings around in the dark.

First the following software drivers and applications will need to be installed.

Orion Video Capture Device

The Orion Video Capture Device enables a Laptop/PC to record and view video from the SSASCII.

Please follow the instructions included with the Orion Video Capture Device CD to install the Device Driver and capture software.

Orion Video Camera Control

The Orion Video Camera Control software, USB to serial adapter and 50ft serial cable enable the SSASCII to be remotely controlled via Laptop/PC.

Please follow the instructions included with the Orion Camera Control CD to install the USB to Serial Adapter Device Driver and Camera Control software.

Orion HandyAVI Special Edition

The Orion Handy-AVI Special Edition software features Timelapse and Meteor detection software.

Please follow the instructions included with the Orion HandyAVI Special Edition CD to install the software.

Now that the drivers and software are installed the camera can be setup.

Place the SSASCII on a stable flat surface outdoors. The SSASCII can be tested indoors but focusing is best done outside with a real sky.

Power

Plug the male power jack (Red) of the Dual Power/Video extension cable into the SSASCII and plug the mains adapter jack into the female power jack (Red).

Plug the mains adapter into a wall socket. The device should now have power.

Figure 4. The Orion Video Camera Control software interface.

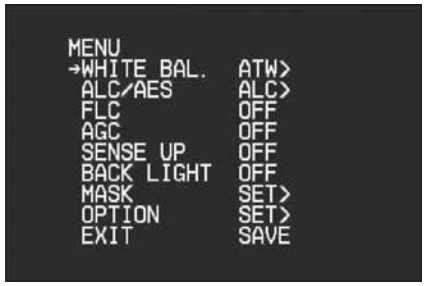

Figure 5. Main OSD menu screen.

When used with the included field battery power adapter and a field battery (such as the Dynamo Pro available through Orion) the SSASCII becomes a more portable device.

Attaching to a TV

Plug the Video jack (Yellow) that is closest to the male power jack (Red) into the SSASCII and the other end into a TV.

Power the TV and select the input channel that the video cable was plugged into.

A live video should now appear on screen. The screen may be black until the camera controls are adjusted.

Attaching to a Laptop/PC

Plug the Video Capture Device into USB port on computer. The device driver and software should have been previously installed. Plug the Video jack (Yellow) that is closest to the male power jack (Red) into the SSASCII and the other end into the Video Capture Device using the cable with Yellow RCA input.

Run Orion HandyAVI software or Orion AmCap and select device "**USB 28185 Device**" in order to see live video on screen.

The screen may be black until the camera controls are adjusted.

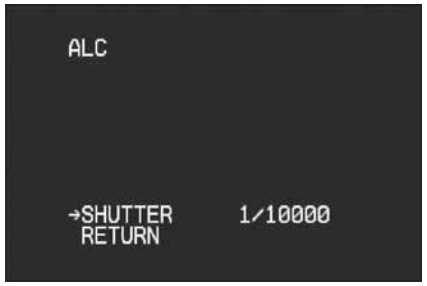

Figure 6. ALC Shutter speed menu.

Camera Controls

The SSASCII camera settings will initially be set to factory default values.

All camera features are controlled via Orion Video Camera Control software.

The Orion Video Camera Control software uses rs-232 protocol to communicate with the camera. The user has the option of using either the serial ports (COM1/COM2) if present on their Laptop/PC or alternatively using the USB to RS-232 adapter. This is useful when a Laptop/PC has available USB ports but no serial ports.

Please read the Orion Video Camera Control manual for installation and usage instructions.

Selections are made using the sliders, dropdowns, buttons and checkboxes in the software interface. **(Figure 4)**. Alternatively an OSD (On Screen Display) menu can be activated by pressing the center button of the OSD Buttons located at the right hand side of the Camera Control Software screen and using the Up/Down/Left/Right buttons to navigate and make changes **(Figure 5)**.

The following text explains each available feature. It is recommended that the user become familiar with all the settings before moving onto final setup.

ALC/AES

ALC – Auto Light Control

SHUTTER

OFF, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000

Automatic Light Control (**ALC**) indicates the image sensor's ability to automatically adjust in diverse lighting conditions to yield the most vivid video image possible Shutter speeds can be selected for different lighting conditions (**Figure 6)**.

For the optimum results at night SHUTTER should be turned OFF.

AES – Auto Electronic Shutter

AES is used when a manual or fixed iris lens is fitted and the shutter speed will respond to the amount of light to keep the signal output at optimum level. **AES** allows changing the iris level automatically without using the auto iris lens.

Note: *The AES should be switched off when an Auto Iris Lens is fitted hence AES is not used in this application.*

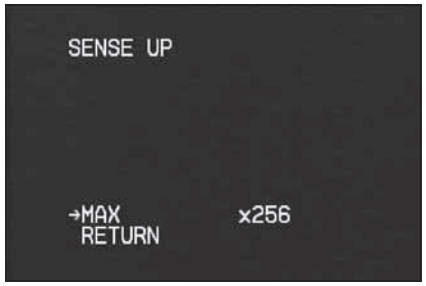

Figure 7. Sense Up menu.

SENSE UP (Slow Shutter)

OFF, x2, x4, x8, x16, x32, x64, x128, x256

Sense-Up: An image processing technology which allows user selectable digital slow shutter speeds in order to allow extra light into a camera thereby providing higher sensitivity in low light conditions (**Figure 7**).

The minimum frame integration (x2) is 1/32 of a second for NTSC (1/40 for PAL).

The maximum frame integration (x256) is 4 seconds for NTSC (5 seconds for PAL).

Set SHUTTER SPEED (ALC) to OFF for frame integration.

Low light objects such as stars and the Milky Way require a high value sense up setting such as x256 which gives a total exposure time of up to 4 seconds NTSC (5 seconds PAL).

BACK LIGHT – Background Light Compensation

Background Light Compensation is used when there is a very bright background with very dim front image.

Note: *BACK LIGHT is not normally used for astronomy.*

AGC – Automatic GAIN Control

ON or OFF

The **AGC** function provides a clear image in low light condition. This controls an amplifier that is used to boost the video signal when the light dims so as to increase the camera's sensitivity.

FLC – Flickerless mode

ON or OFF

Flickerless mode is used for suppressing the flicker of light (illuminating the captured scene) produced depending upon the frequency of the power source. In 50Hz area, the CCD exposure time is 1/50sec and if NTSC camera is used with working frequency of 60Hz, there will be flicker on the screen. Same will happen in using PAL camera in a 60Hz area. The shutter speed is fixed to 1/100 sec for the 50 Hz area and 1/120 sec for the 60 Hz area to reduce the flicker of the fluorescent light.

Note: *FLC is normally set to ON.*

PRIORITY

PRIORITY (**AGC/SENSE**) controls the auto-darkening on bright objects.

WHITE BAL. (white balance)

CCD security cameras feature this adjustment to compensate for ambient light color. Since there's a color difference between standard light bulb light and sunlight, white balance adjusts to ensure a more realistic picture.

There are two white balance control modes, namely Auto tracking white balance (**ATW**) and Auto White Balance (**AWB**).

AWB – Auto White Balance

AWB is a preset type function whereby white color in the scene is detected and white balance is automatically adjusted, then the setting status is stored. It automatically memorizes the adjusted white balance value every time the **AWB** is selected. **AWB** is most suitable for environment with little change in light source.

ATW – Auto Tracking Balance

NARROW (darkness adjustment)

WIDE (Light adjustment)

ATW functions by detecting white color in the scene at a color temperature from 3200 to 10000 Kelvin. The color temperature is being monitored continuously and the white balance is set automatically by internal controller.

ATW is most suitable for viewing objects with changing color temperature and which can make the picture color look more natural. This mode is also helpful in light polluted skies.

DAY/NIGHT (Color Mode)

AUTO – Automatically switches to **COLOR** for bright objects and BLACK & WHITE for low light object.

DAY/EXT – **COLOR** mode always.

NIGHT – BLACK & WHITE mode always.

GAMMA

TYPE A – 0.45 Gamma (Lighter)

TYPE B – 1.0 Gamma (Darker)

ENHANCER

MID Sharpness or HIGH Sharpness

H-REV (H Flip)

Horizontal Mirror Function – Image is flipped in the Horizontal axis.

V-REV (V Flip)

Vertical Mirror Function – Image is flipped in the Vertical axis.

ZOOM

Digital zoom x2 – ON or OFF

The Digital zoom is a useful feature to aid focusing.

OPTION

The option menu contains features that will be modified less frequently than the main menu features. (**Figure 8**).

TITLE

Use keyboard to type or use UP/DOWN/LEFT/RIGHT and CENTER buttons on software to select up to 20 characters to be used as an on-screen title (**Figure 9 & 10**).

COLOR BAR

The Color Bar (**Figure 11**) is a useful feature to test video output from camera to your viewing device.

MASK

A security camera feature for privacy masking. Not used in this application.

RETURN

Select to return to main menu.

EXIT

SAVE – exit and save current settings.

PRESET – exit and default to factory defined settings.

Figure 8. OPTION sub menu.

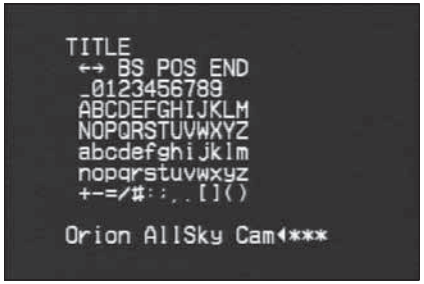

Figure 9. TITLE edit menu.

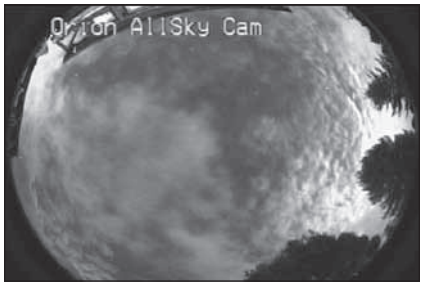

Figure 10. TITLE being used with live image.

Figure 11. Color Bar Test.

Typical Camera Settings

For best daytime images

WHITE BAL.	ATW
ALC/AES	ALC (SHUTTER 1/10000 to 1/100)
AGC	OFF
SENSE UP	OFF

For best nighttime images

WHITE BAL.	AWB/ATW
ALC/AES	ALC (SHUTTER OFF)
AGC	ON
SENSE UP	ON (x2 to x256)

For best dual day/night images

WHITE BAL.	AWB/ATW
ALC/AES	ALC (SHUTTER OFF)
AGC	ON
SENSE UP	ON (x2 to x256)

Try several different settings to get a feel of how the camera controls work and affect the resultant image on the computer screen. The WHITE BAL, SHUTTER speed (ALC) and SENSE UP (Slow Shutter) controls are the ones you will use the most.

Final Setup

Removal of Dome Bubble

In order to initially focus your view, the dome cover will first need to be removed.

Use the included allen key to unscrew the 4 vandal-proof screws on the top of the SASC. Be careful not to hit the acrylic dome with the allen key, screws or other hard objects. Also be careful not to lose the non standard Vandal-proof allen key.

Carefully lift the dome cover directly upwards from the base and place in a safe location.

Remove the lens cap. Be careful not to touch the lens to avoid having to clean it.

(Cleaning supplies sold separately by Orion)

Focusing

Now using your live view as a guide, adjust the zoom (focal length) and then adjust the focus of the fish eye lens using the thumbscrews on the side (**Figure 12**).

The SSASCII lens has a variable focal length from **1.4mm** to **3.1mm** giving a range of field of view.

As the camera user, you get to decide which setting is preferred for your particular needs (**Figures 13, 14**).

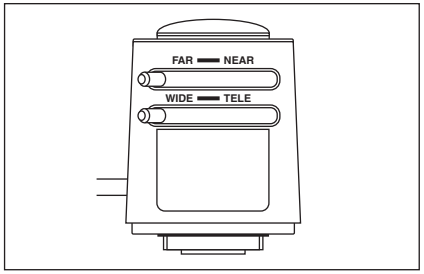

Figure 12. The SSASC fish eye lens.

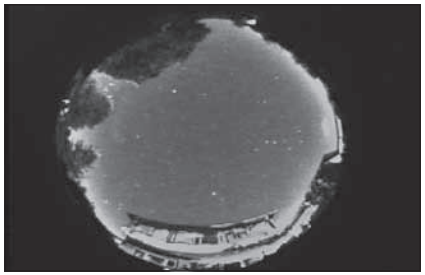

Figure 13. At 1.4mm more sky is seen (~181 degree angle of view). Image is smallest and low detail resolution.

Figure 14. At 3.1mm less sky is seen (~90 degree angle of view). Image is larger and higher detail resolution.

2X Digital Zoom

Use the 2X digital zoom feature in the options menu as a focus aid. This mode is most useful at night to focus on stars. Turn off the 2X digital zoom when finished focusing.

Focusing can be difficult with longer exposure settings. If possible set the camera to a faster exposure time (SENSEUP x2) whilst focusing.

At night longer exposures are necessary (SENSEUP X256) in order to see as many stars as possible under the given conditions. Therefore more patience is required when focusing to see the adjusted result on screen (~4 seconds).

After focusing, the dome cover can now be placed back onto the base.

Re-Installation of Dome Bubble

Carefully line up the groove on the inside of the dome cover with the notch on the base and gently allow the cover to drop into place. The dome cover should now be seated evenly and all 4 screws lined up ready for installation.

Using the allen key, gently tighten each screw until a small bit of resistance is felt, then move onto the next screw. Repeat for all screws. Next tighten each screw more firmly and evenly to help ensure a weatherproof seal.

Take some time to use the camera during the day to become familiar and comfortable with its basic operation. For best results, you can optimize your images with the camera controls.

Now that you're familiar with basic camera operation, it's time to take the SSASCII out at night under the stars to capture some astronomical images.

When installing at night, follow the same focus procedure as in daytime. Be patient as focusing on stars in longer exposure mode (SENSEUP X256) will take ~4seconds to update on screen. Also use the digital zoom to aid in focusing.

A permanently installed SSASCII should only require you to set the focus once when initially installing.

The Dome Bubble cover can be wiped clean with a damp soft cloth.

Be careful not to scratch the surface when cleaning or moving the device.

(Spare domes are available at Orion)

Post Setup

Viewing and Capture on Laptop/PC

View and capture your skies on a laptop or desktop PC by using the included Capture Device. (See Video Capture Device Manual for installation and usage instructions).

Time-lapse and Meteor Detection

Install the included Orion HandyAVI® Special Edition software by selecting "install Orion HandyAVI SE" from the launcher menu. Instructions are located on the launcher menu and in the software drop down help menu.

The Orion HandyAVI® SE software features Timelapse, Meteor detection and the ability to send images via email and movies/images via FTP to a website. The software also includes features such as timestamps, Scanning AVI files for meteors, frame selection and automated time/day recording.

Display on a Web Page

The Orion HandyAVI® SE software CD launcher features a guide to displaying images and movies on websites.

Mounting Options

As well as being a portable device, the SSASCII can be permanently installed on buildings with additional accessories. (Mounting options sold separately by Orion)

Extension cables

The included 50 foot dual Power/Video cable can be further extended with an additional cable (sold separately by Orion)

The included 50ft serial computer control cable can also be further extended with an additional serial cable extension (sold separately by Orion).

Replacement Dome Cover

Replacement dome covers are also available for the SSASCII (sold separately by Orion).

Specifications

Sensor:	Mintron Color sensor 52K9BHN-EXCS (NTSC); 52K9BHP-EXCS (PAL)
TV System:	NTSC/PAL Composite Video out (BNC/RCA)
Sensor size:	1/2”
Number of pixels:	0.4 megapixel resolution NTSC – 768 x 494 (effective) 811 x 508 (total) PAL – 752 x 582 (effective) 795 x 596 (total)
Pixel size:	8.4µm x 9.8µm
Video frame rate:	NTSC: 30 frames/second; PAL: 25 frames/second
A/D conversion:	8 bit
IR filter:	Yes
Operation Temperature:	-20°C to 50°C
Power Supply:	DC12V 150mA

One-Year Limited Warranty

This Orion product is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion’s option, any warranted instrument that proves to be defective, provided it is returned postage paid. Proof of purchase (such as a copy of the original receipt) is required. This warranty is only valid in the country of purchase.

This warranty does not apply if, in Orion’s judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights. It is not intended to remove or restrict your other legal rights under applicable local consumer law; your state or national statutory consumer rights governing the sale of consumer goods remain fully applicable.

For further warranty information, please visit **www.OrionTelescopes.com/warranty.**

Orion Telescopes & Binoculars

Corporate Offices: 89 Hangar Way, Watsonville CA 95076 - USA

Customer Support: **www.OrionTelescopes.com/contactus**