

STELLACAM II TM

BASED ON WATEC 120N

A REVOLUTIONARY DEEP SKY VIDEO CAMERA



**DEEP SKY IMAGES THAT RIVAL CONVENTIONAL COOLED CCD
CAMERAS**

18th magnitude with an eight inch telescope

"The on screen views are simply overwhelming." Jim Ferreira

Read one user's comments on the StellaCam II from the Winter Star Party

--- In starmaster_scopes@yahoogroups.com, mharveyww1@a... wrote:

> Hi Richard...

>

> I just returned from the Winter Star Party where I used the
Stellacam II with

> my 24" Starmaster.

> While it is certainly true that this device turns smaller scopes
into

> 'over-achievers', imagine what it does for BIG scopes.

> M-82, for instance, looked like what you'd expect from the HST!

> All those twisted knots and filaments of dust, gas and explosive
star

> formation were 'plain as day'....and the contrast was so dramatic that it appeared
> almost almost three-dimensional.
> Everything is, indeed, relative...and big scopes perform even bigger! :)
>
> Mike Harvey

INTRODUCTION:

Adirondack Video Astronomy is pleased to announce the latest addition to the highly regarded ASTROVID line. Our latest offering is the **ASTROVID StellaCam II Astronomical CCD Video Camera**. Following in the tradition of the StellaCam Ex; the StellaCam II represents a further enhancement and advancement in Deep Sky Imaging. The images of the StellaCam II rival COOLED conventional CCD cameras.

The StellaCam II is an excellent introduction to Deep Sky imaging for those who appreciate the versatility of a "True" video camera. The output of the camera can be displayed on a TV, VCR, Monitor, Laptop or desktop computer.

The On-Screen (Monitor) image of brighter objects Messier objects such as the Dumbell Nebula rivals processed CCD images. The views on the monitor are spectacular. This improvement makes the StellaCam II especially well suited for school, planetariums, college, universities and industry and both the beginning imager and advanced imager.

There is a separate remote control box for slow shutter speed (frame accumulation), gain, gamma (contrast) control and freeze frame.

The freeze frame button will freeze your on screen image on the monitor. This is useful when you have an image you want to describe or display for a large group. Once the screen image is frozen, the telescope can be slewed to the next object while a discussion is being a given for the current on-screen image.

HIGHLIGHTS:

1. "True Video" System for the maximum in versatility - Monitor display, auto-guiding, computer image capture and image processing , etc..
2. Low Noise
3. Excellent Dynamic Range (allowing very faint details to be captured)
4. External control box for Manual control of Shutter Speed, Gain and Gamma. **To run long distances you will run the PC Control for the StellaCam II.**

5. Very small size
6. Camera runs cool - preventing in most instances, the buildup of warm pixels.
7. Very smooth and even background with gain and gamma set at midlevel
8. **Excellent "LIVE" picture that is very comparable to a 10 second cooled CCD camera image.**

CCD SENSOR:

IMAGE SENSOR The camera uses the Non-Ex View version of the SONY CCD.	AV-STCAM-II EIA SONY ICX418ALL.pdf AV-STCAM-II-P CCIR SONY ICX419ALL.pdf
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The StellaCam II Technology optimizes the use of the Non Ex-View SONY HAD CCD. The choice of this CCD results in an image of very low noise and very few hot pixels. The combination of the very low noise of the SONY CCD with very low noise electronics in the StellaCam II results in a marked improvement in signal to noise (S/N) ratio. This improved S/N ratio enables the StellaCam II to reach 18th magnitude in an eight inch telescope. The images are very clean at midlevel gain and gamma settings. The views are so impressive compared to the visual views that it is like have a telescope 5X larger in aperture !

The onscreen monitor image is very impressive or as Jim Ferriera states, "The on screen views are simply overwhelming."

The 256 frame accumulation combined with internal camera electronics that are very low in noise results in an **extremely sensitive** camera. Objects like the Veil Nebula, Cocoon Nebula, Andromeda Galaxy Dust Lanes can be easily captured.

REQUIREMENTS FOR OPERATION OF CAMERA:

1. A moderately accurate drive; capable of making 8.5 second (NTSC -USA) to 10.24 second (PAL-OVERSEAS) exposures
2. Moderately accurate polar alignment.
3. Monitor, TV, VCR or Camcorder to view, capture or record images.
4. 110 volt or 220 volt mains power supply. OPTIONAL 12 volt power cable available.
5. Use of a computer to capture and process images via optional frame capture cards (Imperx, Flashbus MV-Lite) and image processing software. (Astroart, Maxim CCD, K3 CCD Tools & Registax)
6. To take advantage of the full resolution of the CCD chip in terms of computer captured images, we recommend the Imperx Laptop PCMCIA

capture card and FlashBus MV Lite PCI Desktop Capture card. (Be careful if you are looking at inexpensive USB capture systems, as most of the low cost systems capture in only a 320x240 resolution mode. This will only give you a very small postage stamp image size image on the computer screen.)

7. To take full advantage of the sensitivity of the camera a fast optical system is recommended, ie. an F/3.3 or F/4 system will perform much better than an F/10 system and will place less demands on the accuracy of a mount. Hyperstar and FASTAR Secondary replacement optical systems should work with the proper adapter. We recommend the OPTEC f.3.3 NextGen focal reducer system as it can be easily adapted for color imaging via the unique pin registration system.

OPERATION OF CAMERA:



Back of Control Box - Upper Left - 12 pin Hi Rose Connector, Top Right - Female BNC Connector, Lower Right - Female 12 volt power plug

1. The operation of the video camera is very simple. The video signal output on the back of the StellaCam II is a composite video signal via the BNC connector on the back of the camera. A 24-25 foot 75 ohm shielded video cable is supplied with the complete system. A RCA connector is supplied on the output side of the cable. (optional longer video cables are available) The BNC connector on the video cable is push fitted onto the back of the camera and then twisted until it locks in place.
2. The RCA output connector from the camera goes into any RCA VIDEO IN jack on a camcorder, television, vcr, monitor, frame grabber etc..
3. A 110 volt or 220 volt to 12 volt DC power supply is also included. The wall transformer will supply power to the camera. Optional 12 volt power cords are available. The 220 volt or 110 volt is plugged into the mains power supply and then plugged into the lower right hand side connector on the back of the camera.
4. The external remote control box is plugged into the back of the camera via the 12 pin Hirose connector. You must be careful when plugging in this connection so as not to break off any of the small pins. IT IS RECOMMENDED THE CONTROL BOX BE PLUGGED IN IN BRIGHTLY LIT CONDITIONS. DO NOT ATTEMPT THIS IN THE DARK AS ANY MISHANDLING AND SUBSEQUENT DAMAGE WILL RESULT IN A COSTLY REPAIR.
5. The Remote Control Box has four functions:

6. The first is the **Slow Shutter Speed Frame Accumulation Mode**. This is the timed exposure setting for the camera. This accumulation of frames acts as a slow shutter speed mode for the camera. The frames are co-added within the camera permitting exposures of up to 8.533 seconds for the NTSC model and 10.24 seconds for the PAL model. The OFF setting on the control box is the standard video shutter speed of 1/60 second (.017 second) for NTSC (EIA) frame and 1/50 second (.02 second) for CCIR (PAL) frame. Setting 1 is one frame added to the original frame etc. .

FRAME ACCUMULATION (frames added to initial frame)	NTSC	PAL
OFF	.017	.02
1	.033	.04
2	.067	.08
4	.133	.16
8	.267	.32
16	.533	.64
32	1.067	1.28
64	2.133	2.56
128	4.267	5.12
256	8.533	10.24

7. The next function is the **Gain Rheostat**. The manual gain control has settings of 8-38dB. 8 corresponds to the lowest gain setting and 38dB corresponds to the highest gain setting. The midlevel gain is near 18 dB. For most applications you will not have to go beyond the mid level gain settings. As you increase the gain setting the sensitivity of the camera increases. The noise in the image will also increase as the gain increases. The goal is to keep the gain as low as possible and still have a high quality image on the screen. Higher gain settings can be used to isolate a particular feature in an object that would otherwise be invisible at lower gain settings.

8. The next function on the control box is the **Gamma setting**. Gamma relates to contrast. There are three gamma settings .35, .45, and 1.0.

9. The Red Button on the side of the control box is the **Freeze Frame Button**. By pressing the freeze frame button once , the image on the monitor will be frozen. It will not change. This allows the imager to select the best possible image. This is useful for explaining features in an object to a group. Pressing the button again will star the normal rate of video frame capture again.

CONFIGURATIONS:

Focal reducers:

It is recommend the you use as fast an optical system as possible. Schmidt Cassegrain telescopes are the most popular amateur optical systems. The use of a .33X focal reducer either OPTEC or Meade will enable the SCT user to get the best possible images from the StellaCam II. The .33X focal reducers cannot be used optically but are the preferred system for widefield astronomical imaging.

A F6.3 focal reducer, either Celestron or Meade can be used but you will not give the optimal performance that an F/3.3 that an OPTEC focal reducer will do.

With a Refractor you may be able to use instrument dedicated focal reducers or the SBIG E-Finder /FR237 in you have enough inward focus travel. The FR237 / E Finder focal reducer from SBIG will also work on SCT's.

Secondary Lens Assemblies- Hyperstar and FASTAR:

An even wider field of view can be obtained using two systems that replace the secondary mirror (Front End Mirror) on the telescope. They are the Hyperstar from Starizona (<http://www.starizona.com/hyperstar/>) and the FASTAR from Celestron.

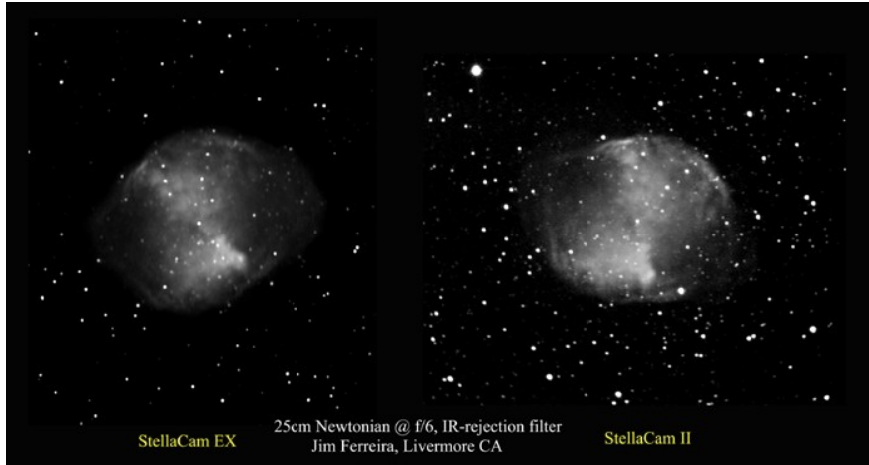
IMAGE CAPTURE AND PROCESSING:

DEEP SKY IMAGING WITH THE STELLACAM II COMPARED TO THE STELLACAM EX

John,

You may find these two images of M27 of some little interest. They are not shot side by side or identically processed, however, they represent best effort imaging and processing under relatively similar seeing conditions and object altitude above the horizon. Both images were made up of approximately 60 frames, stacked in RegiStax and processed in Photo Shop. The StellaCam EX image took a lot more tinkering in Photo Shop to bring up the fainter structure in the nebula than was required for the StellaCam II image. The most curious thing is there seems to be disproportionately more stars in the StellaCam II image.....

One is great, the other is even better.....uh, well, in my humble opinion, of course.



IMAGES: NO DARK FRAMES

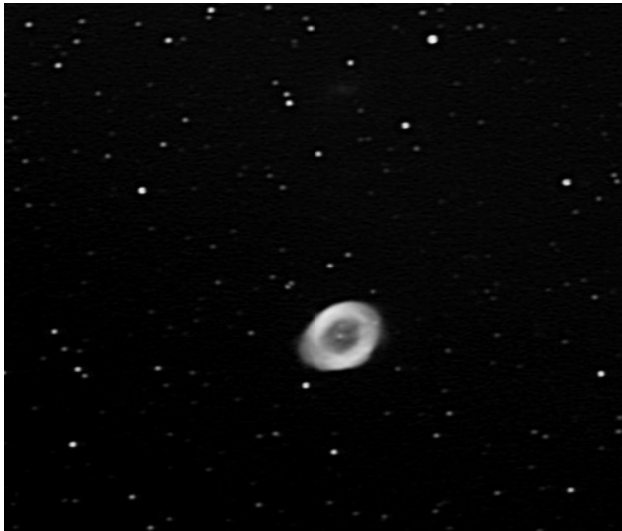


Image B **M57 Ring Nebula**
(contains stars to 18th magnitude) by Jim Ferreira 10 inch F/3 Telescope, 256
Frame accumulation.

BEAUTIFUL STELLACAM II IMAGES by Jim Ferreira 80mm Celestron Cometron

I have never seen the Horse Head nebula live before, though it was faint on the monitor, it was clearly visible. The Flame nebula was quite bright on the monitor. I did not see the nebulosity associated with the Pleiades cluster on the monitor, frankly didn't think the camera would be sensitive enough, so you can imagine my delight when the nebulosity surfaced while image processing. By the way, the diffraction spikes were intentional. I put two pieces of narrow tape across the front aperture of the scope to simulate secondary mirror spider diffraction spikes. Reminiscent of those vintage Palomar and Lick deep sky photos. Multiple dark lanes were clearly visible in M31 on the monitor...extremely cool.

All of the images were shot with a cheap 80mm f/5 refractor, one of the Celestron "Cometron" scopes sold for the return of Halley's Comet. I used a short focal length cemented achromat lens for a focal reducer, and an IR-rejection filter, though with the StellaCam II it may not be as necessary to use the filter as it was with the StellaCam EX.

Video on...
Jim



SPECIFICATIONS:

MODEL NUMBER	AV-STCAM-II (NTSC) AV-STCAM-II-P (PAL)
BROADCAST SYSTEM	AV-STCAM-II EIA AV- STCAM II -PCCIR
IMAGE SENSOR The camera uses the Non-Ex View version of the CCD.	AV-STCAM-II EIA SONY ICX418ALL.pdf AV-STCAM-II-P CCIR SONY ICX419ALL.pdf
CCD TOTAL PIXEL NUMBER	795 (H) X 596 (V) 811 (H) X596(V)

SCANNING SYSTEM	525 LINES 60 FIELDS/SECOND NTSC 625 LINES 50 FIELDS/SECOND EIA																																	
SYNC SYSTEM	INTERNAL / VD - LOCK (OPTION)																																	
MINIMUM ILLUMINATION	<p>STELLACAM II 18TH MAGNITUDE DEEP SKY IMAGING WITH 8 INCH TELESCOPE</p> <p>0.00002 lux at F/1.4</p> <p>Planetary- 1/60 sec ONLY (see limitations section below)</p> <p>Integration (Deep Sky) mode - UP to 256 Frame accumulation for a 8.5 second NTSC 10.8 second PAL exposure</p>																																	
RESOLUTION	600 TELEVISION LINES																																	
GAIN CONTROL	AUTOMATIC / MANUAL GAIN 8-38dB																																	
SIGNAL TO NOISE RATIO	52 dB																																	
MANUAL FRAME ACCUMULATION SHUTTER	<p>The OFF setting on the control box is the standard video shutter speed of 1/60 second (.017 second) for NTSC (EIA) frame and 1/50 second (.02 second) for CCIR (PAL) frame. Setting 1 is for one added frame etc. .</p> <table border="1"> <thead> <tr> <th>FRAME ACCUMULATION (frames added to initial frame)</th> <th>NTSC</th> <th>PAL</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>.017</td> <td>.02</td> </tr> <tr> <td>1</td> <td>.033</td> <td>.04</td> </tr> <tr> <td>2</td> <td>.067</td> <td>.08</td> </tr> <tr> <td>4</td> <td>.133</td> <td>.16</td> </tr> <tr> <td>8</td> <td>.267</td> <td>.32</td> </tr> <tr> <td>16</td> <td>.533</td> <td>.64</td> </tr> <tr> <td>32</td> <td>1.067</td> <td>1.28</td> </tr> <tr> <td>64</td> <td>2.133</td> <td>2.56</td> </tr> <tr> <td>128</td> <td>4.267</td> <td>5.12</td> </tr> <tr> <td>256</td> <td>8.533</td> <td>10.24</td> </tr> </tbody> </table>	FRAME ACCUMULATION (frames added to initial frame)	NTSC	PAL	OFF	.017	.02	1	.033	.04	2	.067	.08	4	.133	.16	8	.267	.32	16	.533	.64	32	1.067	1.28	64	2.133	2.56	128	4.267	5.12	256	8.533	10.24
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AUTO IRIS	A.E.S. / VIDEO Type Lens																																	
CONTROL BOX - manual control of parameters	GAIN , SHUTTER SPEED GAMMA CONTROL																																	
FREEZE FRAME	FREEZE FRAME OF IMAGE VIA FREEZE FRAME BUTTON ON CONTROL BOX.																																	
FRAME ACCUMULATION (ON- BOARD THE CAMERA)	MANUAL CONTROL BOX - 1, 2 TO 256 FRAMES																																	

VIDEO OUTPUT	COMPOSITE BNC
GAMMA CORRECTION	0.35, 0.45, 1.0
OPERATION TEMPERATURE	-20C TO +50C
OPERATIONAL HUMIDITY	WITHIN 85%
POWER SUPPLY	AC100V, 220V CAMERA POWER REQUIREMENTS DC10.2-13.8V 50/60Hz DC+12V Power supply weight Approx. 236g
Weight of Camera	Camera weight 150 grams

NOTES: