VIXEN VC 200L

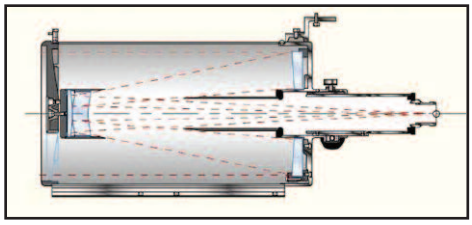
Two Looks at the Visual and Imaging Perfomance of the VISAC

One Astronomer Takes a Visual Tour While Another Enjoys the Imaging Experience.

By Daniel Mounsey and Shawn Hendrix

Daniel Evaluates the VC200L's Visual Capabilities

I was pleased to have the opportunity to report my visual experiences with the Vixen 8-inch VC200L Sixth-Order Aspherical Cassegrain ("VISAC" for short). The VISAC optical system differs significantly from that of the more common Schmidt-Cassegrain Telescope, because it does not rely on a frontal corrector plate. Instead, the VISAC houses a four vane spider supported mount that holds the secondary mirror, while a three element corrector lens resides at the back of the OTA, in front of the focuser.



I personally find this optical design to be an advantage because dew formation on the frontal corrector plate of a typical Schmidt-Cassegrain is a recurring problem. In a way, the VISAC optical tube behaves like a dew shield in itself with its primary mirror safely tucked at the bottom of the open optical tube. This design also speeds up the cooling process compared to standard Schmidt-Cassegrain designs.

With a focal length of 1800 mm, at F/9 the focal ratio is also a bit faster than that of the typical Schmidt-Cassegrain, and its central obstruction, at 40%, is a little larger. Keep in mind though that the VISAC is designed primarily to serve as an astro imaging system, but many observers have been curious to learn more about its visual performance and that is the focus of my report.

The focuser with which the VISAC is fitted is simply wonderful. It is an independent rack & pinion model mounted behind the primary, which remains stationary. Most Schmidt-Cassegrains suffer from mirror shift, to one degree or another. Companies have done their best to minimize this common issue, but it is still present in the many models I've tested. The typical Schmidt-Cassegrain is focused by moving the pri-

Vixen VC200L - 8" f/9 Modified Cassegrain OTA Specifications

Optical Design	Catadioptric
Aperture	8" (200mm)
Limiting Visual Magnitude	13.3 Mag
Focal Ratio	f/9
Focal Length	70.9" (1800mm)
Focuser Design*	2" Rack-and-Pinion
Weight – OTA	13.2 lbs (6 kg)
Tube Length	24.4" (486mm)
Diameter	9.13" (232mm)

*(1.25" or T2 adaptations are optional)

mary optic back and forth, in effect changing the focal length of the optical train to match the location of the imaging sensor or eyepiece focal point, rather than moving those elements to a fixed focal point. This mirror shift can sometimes cause target objects to shift on the focus plane during focus and can be quite troublesome while imaging deep sky objects. Because the VISAC primary stays stationary, mirror shift induced image shift is essentially eliminated.

Another interesting feature is the VISAC's metal side plate which runs along one side of the dovetail plate. This brilliant idea prevents the clamp screws of the saddle plate from marring the dovetail plate and should be incorporated on other designs. Another nice feature is a carrying handle located on top of the OTA. This proved to be very useful when lifting the optical tube on and off the mount. The VISAC is surprisingly light at about 16 pounds including the supplied 7x50mm finder and 1.25-inch star diagonal. Vixen also offers an optional carrying case, and an f/6.4 focal reducer which is highly recommended for imaging.

The focuser does accommodate a larger 2-inch star diagonal if desired. I would have preferred that the 2-inch visual back be equipped with a compression ring instead of the older school thumb screws as this would further help prevent possible oscillation of the diagonal. Compression rings tend to secure diagonals a bit more solidly than set screws alone and also help prevent set screw marring of the diagonal barrel.

These observations took place on June 19, 2007, from Pasadena, California. Seeing conditions on this evening were about 7 out of 10 and nice enough to conduct some good observations of deep sky objects as well as planets. I started my first observations on Vega in order to check collimation and star test the instrument. The collimation was dead perfect, while the optics exhibited just a bit of under-correction.

My first observations started with a Televue 22-mm Panoptic eyepiece. This produced a magnification of 82x, and framed M8, the Lagoon nebula, very nicely. The emission nebula exhibits an ample number of stars for demonstrating the full field performance of the VICAC, and, to my surprise, these were pinpoint from nearly edge to edge and proved to be much tighter than those produced by the Schmidt-Cassegrains I've tested in the past. I then slipped in a 2-inch star diagonal and my 35-mm Televue Panoptic eyepiece for a magnification of 51x, and, once again, the stars were pin point from nearly edge to edge.

One thing that really stood out while focusing the image was the actual focuser itself. The VISAC's stock focuser is one of the smoothest I've ever tested and I really liked it; in fact it felt even nicer than the focuser on my 6-inch Takahashi refractor. Two other observers who were present during this observation agreed that the rack and pinion focuser was exceptional.

Jupiter was pretty well placed at this point, so I decided to put in some higher magnification using a Pentax 10-mm XW eyepiece to yield 180x. Although the deep sky images were quite wonderful, the size of the central obstruction was a bit less favorable for teasing out optimum contrast of the features of Jupiter. Jupiter however still

revealed a number of colored belts and enough detail for an interesting and enjoyable view. Although there may be more appropriate choices for planetary observations, it is important to remember that the VISAC was not really designed with planetary work in mind.

Next, I decided to have a look at Alberio, the famous colored double in Cygnus. High magnifications with a Pentax 7-mm XW at 257x, revealed two very nice Airy discs surrounded by a few very faint diffraction rings. The red and blue colors of the pair also stood out quite well.

Overall, the visual image quality of the VISAC was quite impressive, particularly considering how portable and light weight it is. It is a step up in image quality from the typical Schmidt-Cassegrain in my opinion, particularly with regard to edge sharpness. Although the VISAC costs nearly double what an 8-inch Schmidt-Cassegrain optical tube does, I think it's worth it! The build quality is very high and collimation options are almost limitless. There are a series of adjustment screws at the back of the optical tube for collimation by adjustment of the primary and focuser orientation can even be adjusted as well.

Shawn Tries His Hand at Imaging with the VISAC

I would like to thank Woodland Hills Telescope for allowing me to test the Vixen VC200L. I was given the telescope with the claim that the Vixen VC200L was designed to produce one of the best astro-imaging instruments available and I set out to prove them right, wrong, or somewhere in between.

It would not be fair to test the scope on an inferior mount, so the scope was equipped with a Vixen Sphinx Mount, the same that is paired with the VC200L when purchased as a package. I can sum up my impressions of the mount this way: smooth, solid, and Xbox meets astronomy. The Star Book is a fantastic product and the mount/tripod combination a very well engineered machine. But, that is another review for another time.

The VC200L is an excellent visual scope as well as imaging platform. Once cooled and set up properly, the scope delivers sharp, low power images, bright objects with crisp stars, and very good high power images of double stars, carbon stars, and most every other deep sky object I pointed it at. Views of Jupiter were pleasing, but not optimum, due to loss of contrast caused primarily by the effects of the secondary mirror assembly central obstruction. That is the downside of the relatively large 40 per cent obstruction of that assembly.

This however is very important to the photographic side. The large secondary allows the Telescope to fully illuminate a 35mm film frame. This is one of the very nice features of its unique catadioptric design. The VC200L is not a Schmidt-Cassegrain as it may appear upon first inspection. You will quickly notice the lack of a corrector lens on the front of the tube assembly. This is because it uses a sixth order aspherical primary mirror, a convex secondary mirror, and finally a triplet corrector lens. Vixen has assigned the abbreviation VISAC (Vixen Sixth Order Aspherical Cassegrain). I simply call it stunning.

The optical train contains a 3-element corrector which corrects for field curvature and coma much better than a Schmidt corrector. This lends to stars as sharp on the edge as they are in the center of the film or CCD. A nice secondary benefit of the design is that it does not dew up as easily, but you still may want to use a dew shield to protect the secondary from dew. The open tube also cools much faster and cool down is an absolute necessity to image quality. Indeed, the VC200L showed large thermal currents that were very visible in the image until it has fully cooled. Fortunately, this did not take long.

Along with proper cool down, perfect collimation is key to obtaining a good star test. Collimation is accomplished by a procedure similar to that used for Newtonians; tilt of the secondary mirror is first adjusted and then that of the primary mirror. Collimation held much better than with Newtonians I've experienced, but not as well as with a standard Schmidt-Cassegrain. That said, if you are going to use the scope for imaging, take the time to tune it and it will exceed your expectations.

Another benefit of the design is that the fixed primary mirror eliminates the mirror shift that plagues Cassengrains that accomplish focus by moving the primary. While the rack and pinion focuser with which the scope was equipped was a pleasure to use, I recommend adding a JMI "Motofocus" to that focuser for convenient, hands-off focusing. This makes achieving optimum image focus a much faster, less frustrating process.

There are a ton of little things that add up to make this telescope a joy to work with: simple things like a built in camera bracket to more advanced features like a 60mm visual back that illuminates 2-inch eyepieces without vignetteing.

After adding a few accessories such as anti-vibration pads, Vixen's optional f/6.4 focal reducer, and the JMI Motofocus unit, I would agree with Vixen Optics that this is one of the best telescopes available for astro-imaging. This telescope is a good value for the astronomer that is ready to get serious about astrophotography. I rate this telescope a 9/10 for the imager, but would recommend a more traditional Schmidt-Cassegrain for the visual only astronomer, as they would find more aperture and contrast for the same cost.

As you can tell, I was really impressed with this scope and couldn't wait to take it out to clear, dark skies.

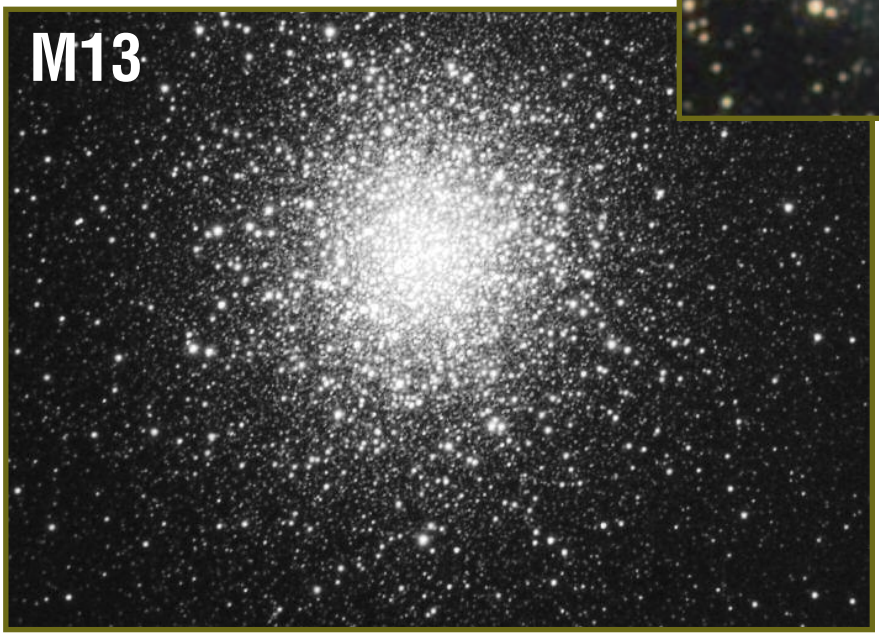
Finally the new moon arrived and I joined an informal gathering of astronomy enthusiasts at Mount Pinos Recreation Area. Operated by the U. S. Forestry Service, the observing site is a large paved parking area at the very end of a paved road (no lights in the parking lot).

A summer evening at the Pinos observing site, which sits at an elevation about of about 8,300 feet, can get pretty chilly after sunset requiring a light jacket. In winter months it is much colder, which means there are sometimes only a handful of people viewing.

However, in the summer there can be more than 150 people enjoying the dark skies, which was the case when I took the VC200L out for its paces. And the skies were dark this night, offering excellent viewing conditions. It took me a couple of hours to get set up, and then for the next six hours I was entranced with using the scope. I have to say, having the complete package with the Sphinx Mount and STARBOOK S, which incorporates Vixen's GOTO controller with a built in star chart that shows you exactly where the telescope is pointing and displays "what's up" right now, just makes constellation surfing so easy and I was able to explore so much more of the sky than I was used to!

That night I shot over 200 short exposures until finally knocking off. I broke everything down and headed home to process the images using the Maxim DL imaging processing software.

I have to say I love my Meade DSI Pro camera and LX75SN8, but the Vixen package was definitely a joy to use and I would not mind seeing one appear in my stocking on Christmas day! ATT



The images of M3, M13 and M27 were taken using the VC200L, Sphinx Mount and a Canon 350D DSLR. Each of the 180 second exposures were unguided, relying solely on accuracy of my initial alignment and the subsequent tracking of the Sphinx Mount.