Telescope House
80mm Apochromatic Doublet

Diameter - 80mm F6.25
Focal length - 500mm
Lens type - FPL53 Apo
Coatings - Fully multicoated
Focus - 2" & 1.25" Dual speed Crayford (rotatable)
Adaptor - 2" to 1.25" compression ring included
Dew Shield - Retractable
Dovetail - Included
Case - Lockable
Instrument length - 40cm (47cm extended)

Introduction

I am not a professional reviewer, indeed this is the first equipment review I have ever written. I hope to give you a flavour of my experience with this scope and that I can be as objective as possible. I am primarily an astro-imager, my bright skies preclude doing much visual work beyond the Moon and planets.

This review was conducted on two scopes, the first sample caused me to raise some concerns about the optics, this first scope was replaced promptly by Telescope House, and I'm pleased to say the second example was much better. I have retained a description of the niggles I found to possibly aid others evaluate their scopes.

Where does it fit?

The telescope under review is fitting into an increasingly crowded mid price range. For a long time the only two real players in this area were William Optics with the Megrez and Synta (Sky Watcher) with their ED80. Recently the market has ballooned with scopes being re-badged or OEM'd by various suppliers and retailers, the choice now is amazing.

Most of the competition for this OTA is from telescopes with doublet lenses variously touted as ED or Apochromatic. One of the benchmarks in this mid price range has been the Synta ED80 with many fine images being produced and published even with largish dSLR cameras.

Despite being billed as an astrograph doublet apochromat, the price would tend to indicate that it will not be competing with top end scopes from the likes of TMB, Astro Physics, or Stellarvue. It seems there may be degrees of 'apo-ness'.

First Impressions

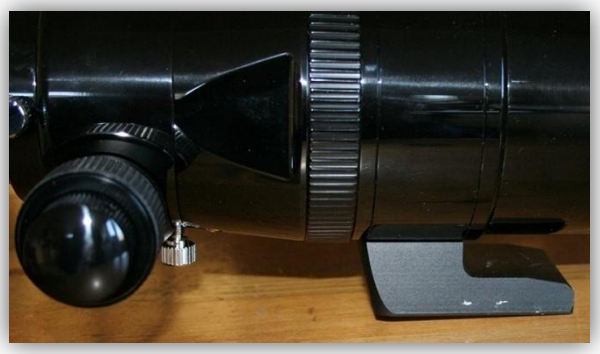
The box arrived safely from Telescope House, the scope was housed in a black plastic panelled case with the telescope in foam lining which has die cut slots to take three 1.25", two 2" eyepieces and a 2" diagonal. The cut outs for the eyepieces appear to be at an odd angle and not straight down as one would expect. Included are some keys for locking the case.

The telescope sits snugly in a shaped cut out in the foam; there is not much risk of any damage to the OTA inside this case.

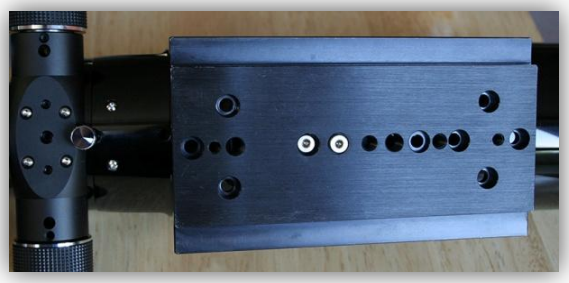
The focuser is a dual speed Crayford type with a 10:1 fine focus knob on the right. The focuser carries details of the scope engraved on the top, and the draw tube is also engraved with a millimetre scale which could prove quite useful. Not show in the image on the right is a locking ring between the focuser and the main tube. Twisting this ring unlocks the focuser and allows it to be rotated, potentially a great feature for imagers.

The draw tube allows a fairly generous 8.2cm of travel.

On racking the focuser in and out it is fairly smooth, not on a par with a Feathertouch, but really quite nice. The fine focus knob worked perfectly. My initial impression was that there wasn't going to be enough friction in the mechanism to hold a camera without slipping. There is a locking knob on the underside which locks the barrel in place and at the same time lets the knobs rotate freely.



Underneath the OTA is a machined 'foot' which is the same dimensions as a Vixen dovetail, it also has a cork pads inlaid and two ¼" Whitworth tapped holes on the bottom. This foot can be removed with two Allen bolts if you wish to use tube rings. As you can see in the image the foot was marred, presumably by the usual Vixen saddle ~~mauling~~ mounting screws, presumably because this was a demonstration scope.



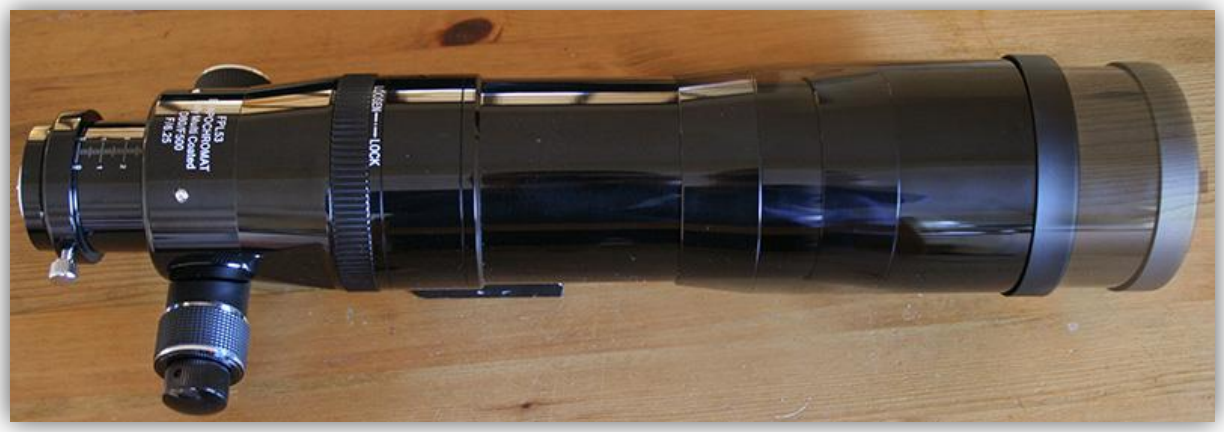
As the scope did not come with any rings I used the two ¼" bolts to attach the foot directly to a spare Losmandy DUPS plate for mounting on my G11. The foot does seem very solid and this mounting method (or using a Vixen saddle directly on the foot) will be more than adequate for visual use. Later imaging runs indicated that it was sufficiently sturdy to hold the scope with a camera attached.

OK, on to the really interesting bit, the lens.

The coatings have a definite green cast; they appear to be even and without any visible blemishes. The lens cell is nicely finished and engraved with all the impressive information about the lens – twice in case you cannot read upside down ☺. Inside the tube is set of plastic baffles pushed up towards the lens as appears to be the norm on these far eastern scopes. These baffles always concern me a little if anyone tries to project a solar image without a front filter (eyepiece projection [eeuk!] or Herschel wedge), though they are fairly close to the lens so the heat shouldn't be too concentrated.

The lens elements are separated with three foil tabs, these intrude in the light path and I expected them to produce visible diffraction artefacts on bright stars.

The dew shield is retractable, and has a nice metal cap. The friction of the dew shield is sufficient to stop to going anywhere on its own; likewise the cap has just the right friction so that it can be easily removed, but will not drop off unexpectedly.



Overall it looked quite promising; I primarily intended to review this scope as an imaging platform though I would of course take a peek through it visually. However my suburban skies do not favour small apertures such as this when used visually.

On to the Mount

I used my G11 to mount the scope, as you can see from the image on the right, this gave me two problems.

The Casady saddle was too long to hold the short Losmandy DUPS plate in both clamps, so the scope had to be off centred, and my lightest counter weight had to be right up at the top of the counterweight shaft to come anywhere near balance! Compared with my 4" SV4 Apo this scope is a real lightweight.

First Light

Always an exciting time, and the first night I had the 80mm it was clear, Ted at Telescope House is a miracle worker!

I popped in an eyepiece well before twilight had ended and grabbed a bright star to align the mount. The thermal turbulence was awful, but the star showed some nice rings either side of focus.

What struck me straight away was that the intra- and extra- focus disks did show some colour, maybe my expectations had been too high. In fact they probably were given the price point of this telescope and the cost of my SV4 (at 6-7x the price) which I was invariably comparing it against. Inside focus showed a red-orange colour to the rings, outside focus showed blue-green, at focus – where it matters – was pretty clean, though the turbulence made it hard to judge fairly.

The out of focus disks also displayed a touch of astigmatism, and at focus looked like either the collimation was off a small tad, or maybe not. For now I was eager to get the camera attached and take an image. It was full Moon, and I chose M45 just 8 degrees way! Dumb or a good test of the baffling? Probably just a dumb choice.

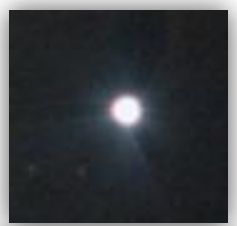
First Image

The camera I used for these tests, was a QHY8 manufactured in China. It uses a Sony APS sized sensor that is similar to the one found in the Starlight Xpress SXV-M25C, and identical to the chip in the Nikon D70 dSLR. This camera has a sensor that with a 28.4mm diagonal across the effective imaging area – a tough test of most telescopes flatness of field and illumination. For all the images taken here I left the infra-red blocking filter in-place on the cameras nosepiece.

I put the camera directly in the back of the focuser using a T-thread to 2" push fit adapter; I was pleased to note that the draw tube had sufficient travel (just) to bring this to focus without the need of any additional extension tubes.

Needs to say there wasn't much detail to be seen in the image *[Image 1 at the back of this document]*, but it did show a few interesting features:

1. I really needed to clean the CCD in my camera! (Done after this image).
2. The baffling appears to do its job; there was no flaring across the image (though there is a massive gradient that is to be expected).
3. The flatness of the field looks quite good, being usable about ¾ of the way out to the edge.
4. The brighter stars do show a little asymmetric flaring, could this be what I was seeing in the eyepiece as a slight mis-collimation? The direction of the flare appears to be the same direction right across the image



5. Oddly, on close inspection the brighter stars over half way out show two directions of flaring at right angles to each other. The bulk of the light is flared radially outwards (as you would expect) but there is a red flare concentric with the centre of the image.

Second Light

After a week and half of frustrating waiting for a gap in the weather (I had two aborted sessions where it clouded over as soon as I got everything set up) the clouds finally parted for a few hours.

Two Inch Diagonals & Barlows

I use a cheap 9mm crosshair eyepiece to perform my mount alignment, I thought I'd use this same eyepiece (with a Celestron 2x Ultima Barlow) to check on that doubt I had about the collimation. Using the crosshair would ensure the star was centred. Unfortunately I hit a problem; with a 2" William Optics diagonal, there was not enough in-focus to bring the eyepiece to focus when using the Barlow. It was not far off, maybe a couple of mm, but not possessing a 1¼" diagonal I had to abandon this idea.

Aberrations?

Using some of my type 6 Naglers I confirmed that the slight astigmatism I saw on the first night was there, as was the bit of colour on intra/extra focus disks. The collimation check proved a little inconclusive; again the seeing was not really good enough. I wound up the power my using a 3.5mm Nagler T6 with the Barlow, this combination did come to focus with 2mm to spare! Again I could see that there was a little bit of asymmetry but the diffraction rings were too unstable to see properly.

Visual

The Double Cluster is one of my favourite objects and it was well placed almost at the zenith. I popped in a 24mm Panoptic (21x) and found the view too wide and sky background too bright. A change of focal length down to a 11mm Nagler T6 (45x) was just about perfect. The 7mm Nagler (71x) still just framed the two clusters but was too much. The 9mm (56x) was pretty good, but the 11mm was just right.

The stars were perfect at this magnification and the sky background nicely dark, giving a view as good as you could expect from 80mm of aperture and a suburban sky.

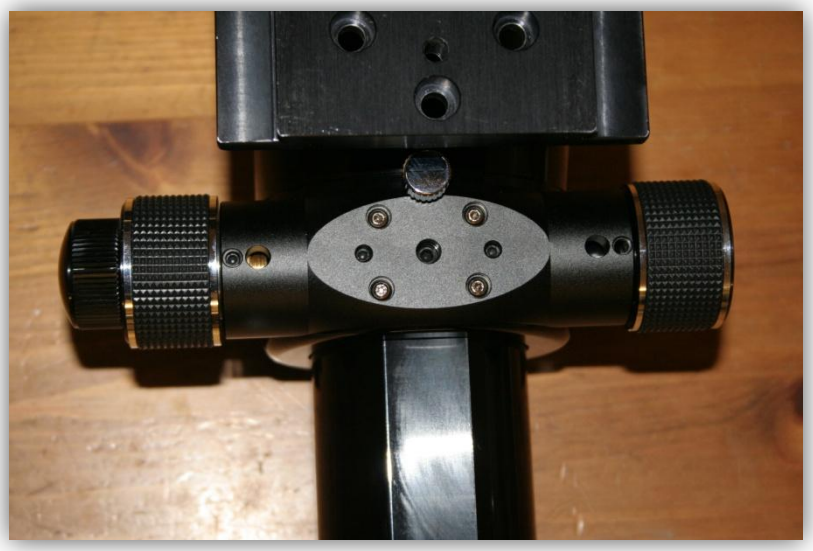
Focuser Mechanicals

I used the rotating focuser to adjust the camera orientation, and this worked quite well. I did however snug up the nylon grub screws that hold the focuser into the rotation mechanism. They were supplied too loose for my liking and allowed the focuser to move around slightly once the retaining ring was slackened. The camera retained focus well when it was rotated, but I found that I could not tighten up the locking ring sufficiently with gloved hands. I used a bare hand to tighten the ring to what I thought was sufficient amount, but found that the focuser could still just 'notch' back and forth a slight amount, though it would not rotate. To remove this final bit of play required the ring to be tightened quite hard. This may improve with use as things bed in, but it did surprise me just how hard I screw the thing down.

I found that the focuser **would** hold the camera when pointing at the zenith – but only just. Adding the Televue TRF-2008 focal reducer/field flattener (which weighs in at 400g including adapter tubes) in front of the camera caused the draw-tube to slowly slip out of the focuser. I fixed this by simply tightening the central screw (of three) on the back of the Crayford bar.

There were no instructions supplied with the telescope to indicate what the three adjustment screws on the focuser do and which you should adjust. I would suggest that Telescope House include

a diagram with the OTAs to explain these screws, and the grub screws on the rotation mechanism, as I found a need to adjust all of them to make the focuser work at its best. At the very least it may stop some support calls if people tighten or loosen the wrong ones.



More Images

Double Cluster [Images 2, 3, 4, 5]

A star cluster is a nice test of any telescopes optics, and the double cluster is pretty too. The first image [*Image 2*] was taken with the QHY8 directly in the back of the 80mm. It is a pretty good image which shows the extent of the area of flat field you can expect. Image 3 shows some magnified centre and corner crops of image 2.

The QHY8 has quite a large chip, so *Image 4* shows the field of view with some other common camera chip sizes overlaid on the image. You should be able to use these to see how well this telescope will work with your camera. You can see that for many cameras there will be no need for any additional field flattening optics.

Finally for *Image 5* I attached my Televue TRF-2008 field flattener/reducer to the camera. I normally use this device with camera when it is mounted on my SV4, it reduces the field by 0.8x as well as flattening it. The spacing of this reducer is critical, it has to adjusted be within 0.5mm to work optimally.

As I did not wish to upset the spacing for the SV4 I did not attempt to re-tune it to this OTA. Even so I think this image demonstrates just what this little should be capable of when coupled with a decent field flattener, whilst there is a little curvature right in the corners, for the general star quality in falls into the pretty good category.

M31 [Image 6]

M31 was well placed, and according to CCDCalc would be a good fit on the QHY8 chip. Again I used the OTA without any field flattener or any filters (other than the IR blocker) so that you can see what the images are like without any aids. I have to admit that M31 is one of my bogey subjects and I have yet to get a decent image of it. And this one taken through the 80mm is no exception to this [*Image*

6] – it is horrible. However it does show that given a decent sky (it was a bit hazy for this shot, and the seeing was pretty bad too) and/or a decent filter (and some better post processing than mine) the little 80 should be capable of a decent image.

A change of OTA

At this point Telescope house suggested that I send back the OTA so that they could have a look at the minor niggles I had. To my pleasant surprise they also sent me a replacement OTA.

Star Test

A quick star test showed that the **astigmatism** of the first OTA **was not present in the replacement**. Telescope house thought that the lens cell on the original may have been a little too tight and the cold possibly causing further tensions on the lenses.

The intra and extra focus colours were still present in the new tube, but in focus these colours disappeared.

The **asymmetrical flaring** seen in the first OTA **was not seen in the replacement telescope** either.

A good result, anyone buying a telescope should critically test it and refer any problems back to the supplier.

The Moon

I thought I'd give this little scope a visual run on the Moon. I was pretty happy with the results.

I started off with an 11mm Nagler T6 (no, I do not have any specialist planetary eyepieces anymore), which nicely framed the whole pin sharp disk at 45x. Next for a bit of power I used my shortest focal length EP, a 3.5mm Nagler T6. This gave some great detailed views along the terminator at 142x, lots of fine detail was to be seen and the image was still sharp and clean. This was much, much better than a Megrez 80 SDII I used to own. This is close to the normally recommended maximum magnification of 50x per inch of aperture, but to see what the scope was like when pushed beyond the call of duty I slipped in my Ultima 2x Apo Barlow.

This did indeed expose the limitations, the bright limb of the Moon showed some colour (red inside focus, blue outside, and a mixture of both in-focus) that could not be eliminated. The terminator with its lower brightness however was still pretty clean, tweaking the focus showed the red/blue colours, these all but disappeared when in focus, just a bit of colour remaining on bright highlights. I actually started to use the colour fringes as a focusing aid.

So even at 285x (with the equivalent of a 1.75mm eyepiece!) the views were pretty good, backing off to 200x (5mm Nagler T6 + 2x barlow) showed what I would consider the maximum usable magnification.

One last Image

It always seemed that the Moon was around when I had an opportunity to test this scope out. And so it proved for the last image I attempted before I sent the scope back after a very long loan. All the images so far had been of clusters or M31 a big bright galaxy, so I thought I'd finish with a brace of smaller galaxies; the ever popular M81 and M82. The 80mm and the QHY8 framed these nicely, and they should be bright enough to image even with a ¾ full Moon.

To overcome the wash of light from the Moon I exposed each frame for six minutes – about as long as I dare without auto-guiding. Again I did not want to use a filter or field flattener so you can see what the raw images look like.

When I looked at the exposures afterwards the CCD had iced up after the first couple, and then the iced dissipated over the next hour – arrgh! Ah well, at least some of the exposures towards the end were usable. The result is *Image 7*.

Last thoughts

I'm not going to say whether you should buy this scope or not – that is your decision. I will sum up my feelings about it, but these are a personal view so use with caution.

Is it great scope? Well no, it isn't up there with a top flight TMB, AP etc., but then look at the price difference.

Is it a good scope? Yes, it is a real step up from cheaper 80mm scopes that are around. I would really have liked to put it back to back with the venerable Skywatcher ED80 which really sets a high standard in the mid range 80mm class. This scope is a bit faster than the ED80 (f/6.25 vs. f/7.5), it would have been interesting to see if the cost of this greater speed is greater field curvature.

Is it a bad scope? No, not at all.

It has a great two speed focuser, and you do need that fine control when focusing a camera. The focuser rotation is a great idea, but in practice I found I did not use it, and just rotated the camera in the 2" push fit.

Overall did I like it? Yes again, but I won't be swapping my SV4 for one ☺. It is not totally colour corrected into the far red, though it does a great job. It is good enough that I kept comparing it to a TMB or SV4, and it does fall short, but then I had to remind myself of the price of this bit of kit. Then you change your mind-set and think – hey, this isn't bad at all!

In closing I must thank Telescope House for supplying the scopes for review which took much longer than I expected. They were a pleasure to deal with.

Mark Crossley

2008

I have no relationship with Telescope House, commercial or otherwise.

The Images

The images in this end section have been inserted into the document at a full 1:1 image size – at some cost to the file size – this is to allow you to zoom in to the PDF and take a really good look at the details. Bear in mind they are still JPEGs and may show some compression artefacts at full zoom.

When taking these images I was not really interested in going as deep as possible, nor was the aim to produce heavily processed pretty pictures. I hope they convey what the image quality is like in a relatively un-touched, straight out the camera way.

Image 1: M45, 10x 30s, QHY8, unfiltered, no calibration

Image 2: Double cluster, 10x 30s, no filter, no calibration

Image 3: Double Cluster corners and centre x300%

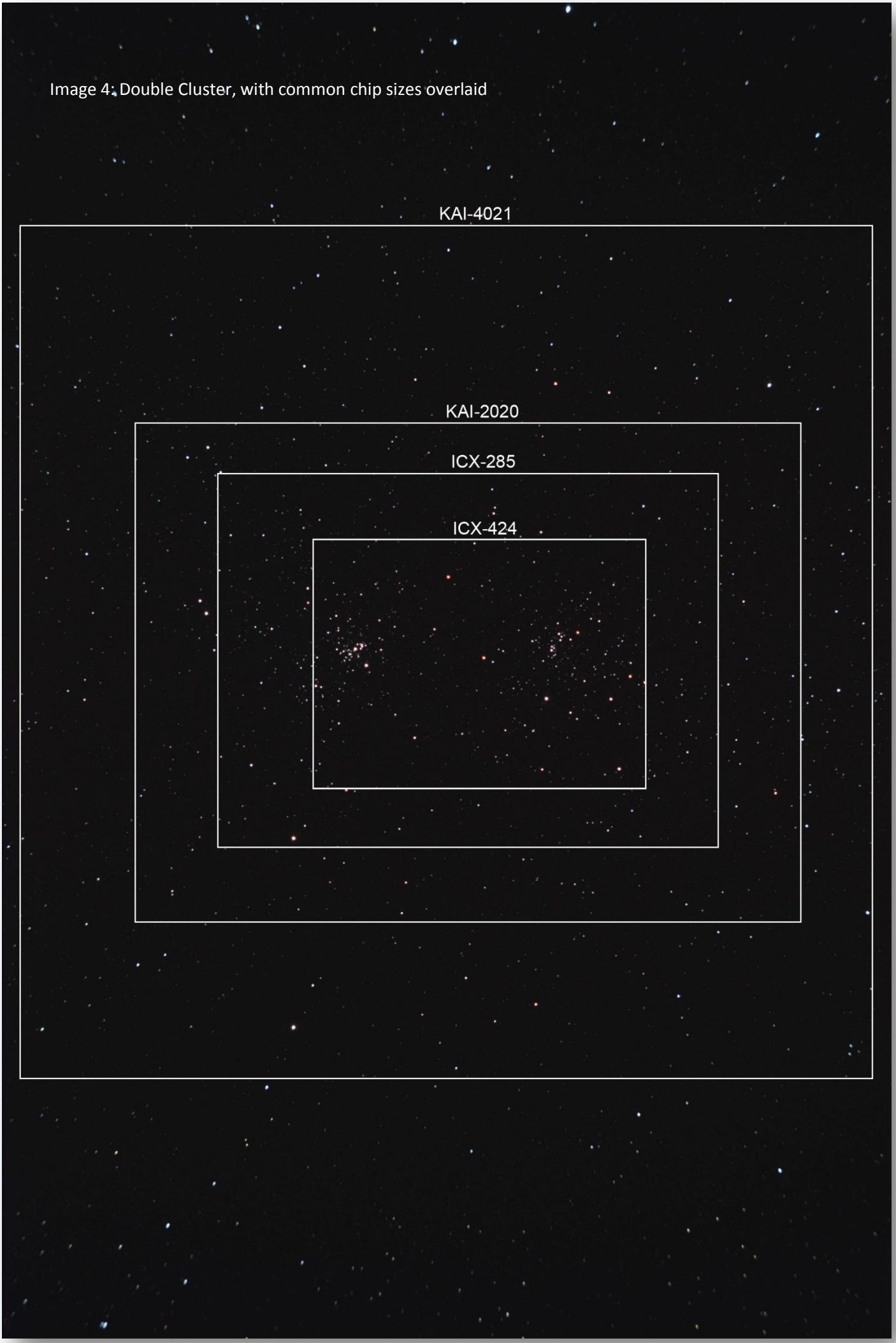


Image 4: Double Cluster, with common chip sizes overlaid

Image 5: Double Cluster, QHY8 + TRF-2008, 10x 30s, IDAS filter, no calibration

Image 6: M31, QHY8, 5x 300s, no calibration – attempt at gradients processing in PS

Image 7: M81 & M82, QHY8, 25x 360secs, calibration = flat frame +bias