Amateur Astronomy *from Chaos Manor South!*

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"A Newsletter for the Truly Outbound!"

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Skywatch
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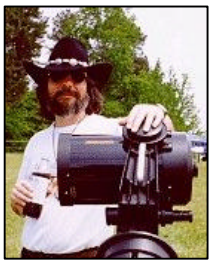
Rod Mollise's

Skywatch



Romancing the Mak…

A Review of the Meade ETX-125EC

Rod Mollise

I've been itchin' to get my hands on a Meade ETX 125. After all, the ETX 90 in both its original and computerized (EC) versions has become a modern classic in amateur astronomy. It's a 90mm Maksutov Cassegrain telescope with absolutely exquisite optics—easily on a par with those of the famed Questar 3.5—for a bargain price. The "EC" version of this cute little telescope adds the Autostar computer controller that allows the scope automatically "goto" any one of thousands of objects (and provides many other interesting capabilities as well). Now that Meade has pretty much worked the bugs out of its Autostar software, the ETX 90 EC has become a familiar fixture at local star parties. But what of **big brother**, the **ETX 125?**

Following the success of the 90, Meade decided to offer a larger aperture version of its big hit. The 5 inch ETX 125 was a much-anticipated telescope. Could Meade pack the functionality and optical quality of the 90 into a big package while keeping the scope at a bargain price? And how *would* Meade keep the scope popularly priced? Would they merely upsize the plastic 90, or would the 125 be in another league quality wise? These burning questions were, it seemed, answered in the negative shortly after the ETX 125 was released. Sadly, the heralded 125 hit the streets with a resounding *thud*.

What was wrong with this bird? The most serious problem in early 125s was severe *mirror shift*. Like other telescopes that focus by moving the primary mirror, a small amount of image shift was to be expected in the 125. Mirror shift of around 45 arc seconds in MCTs and SCTs is considered "normal." But the initial ETX 125s suffered focus shift that was measured in **minutes**. This meant that focusing a planet at high power could move the object right out of the field of view of the eyepiece! To their credit, Meade didn't waste much time in getting the problem solved, recalling scopes and halting production temporarily.

Then there were the Autostar problems. Connecting the computer controller to the 125 resulted in spotty goto performance and some very annoying quirks. Sure, the scope could be used "manually" with the included "electronic controller." But what fun was that? If you couldn't draw on the services of the Autostar, why not just buy a Russian Maksutov, like an Intes? The 6 inch

Intes offers more aperture and all metal construction. Again, Meade tackled the problem, issuing continuing revisions to the Autostar software that have culminated in the present version (2.1ek).

Would Meade's hardware and software improvements make the ETX 125 into the goto wonder and optical powerhouse that it was advertised as? Only hands-on experience would tell. There are plenty of Internet rumors and stories about the 125, but it's difficult to sort fact from fiction online! Except for brief looks at 125s at star parties, my curiosity about the 125 went assuaged until this winter. I *finally* had the opportunity to do extensive testing on an ETX 125 thanks to Wal-Mart.

Our local Schillenger's Road Wal-Mart in Mobile was one of the top stores in the country in telescope sales this past Christmas. In recognition of this, the company donated an ETX 125 to our club, the Mobile Astronomical Society. Just as soon as possible, Pat Rochford picked up the scope from Wal-mart's regional optical shop manager and we eagerly began to run it through its paces. We could hardly wait—there's nothing like a new scope of any kind!

What's the first thing that strikes you about the 125? It's *big and pretty*. It looks much larger in person than it does in those colorful Meade ads in the magazines. It's heavier than you thought too, weighing in at about 19 pounds without a tripod. What's in the box? Other than the ETX 125, you'll find the manual "electronic" hand controller, a 26mm Meade series 4000 Plossl, and an instruction manual. A final item is a heavy and nicely machined aperture cover to protect the 125's corrector plate.

The manual controller works as advertised, driving the scope in altitude or azimuth (or RA and declination if you've polar aligned the scope). If you do not have the Autostar computer and want the scope to be able to track objects, the only option is to polar align the 125 by tilting it over on the Meade tripod to point the fork at the celestial pole. Several different slewing and guiding speeds are available from the e-controller, but the scope will NOT automatically find objects—this requires the optional $99.00 Autostar.

Standard Manual "Electronic" Controller

The included Plossl eyepiece, while not of "premium" quality, is certainly better than the Kellners and "Modified Achromats" (also Kellners) that Meade and other manufacturers have tended to include with scopes in recent years. The 4000 has both a better apparent field of view and better edge of field sharpness than your average Kellner or MA. Like all Meade's eyepieces, it's packed in one of their nice screw-apart "pill bottle" type containers.

The manual that is included with the ETX is a disappointment. It hasn't been revised much since Meade first released the scope several years ago, and could stand a complete rewrite both in terms of clarity and completeness. Surprisingly, the manual does not address the Autostar at all. Data on the computer is found in a separate booklet packed in the Autostar's box. Don't get me wrong, the 125 manual is not exactly *horrible*. It was quite sufficient to enable us to get the scope assembled and ready to go. But it does suffer in comparison to Meade's more recent scope manuals. The best of these, the user's guide included with the small ETX 60 and 70 scopes, could serve as a model for what the 125 manual—or any set of telescope instructions—should be.

As for the metal aperture cover…I just wish the rest of the scope were as solidly built as this lens cap!

Naturally, Pat and I were interested in operating the scope with the Autostar, so we set the electronic controller aside and unpacked Meade's digital marvel. Unlike some scope hand paddles I've used, the Autostar is both comfortable to hold and equipped with sufficient pushbuttons arranged in logical fashion. In addition to an enter key, a "mode" key, cursor arrows, direction keys, and a help button, the 497 possesses a set of numeric keys to aid in entering coordinates and other numeric values. The only disappointment here is the *very* poor instruction guide shipped with the Autostar. This small, poorly illustrated booklet needs to be completely redone. Ideally, instructions for the Autostar would be contained in the main telescope manual. It was annoying to have to refer to two separate booklets when setting the scope up for the first time. I *was* able to get the computer going easily enough, but only because I had experience with Meade's other Autostar telescopes.

The first time the 125 is used with the Autostar, the owner is required to "train" the telescope drives. This allows the computer to adjust for backlash and other variables involving the scope's gear system. This training can, according to

Meade, greatly enhance goto accuracy. The procedure is a simple one. You point the scope at a stationary target (Meade recommends a distant terrestrial object, but Polaris might be even better). Due to clouds on this First Light Night (wouldn't you know it?) I trained the drives on a far-away streetlight. Once I had the streetlight centered in the field of the 26mm eyepiece, I began the training run. The Autostar slewed the scope in azimuth and instructed me to recenter my target. This was easy enough, with the Autostar even indicating which key I needed to push. Once the light was back in the center, the computer slewed in the opposite direction, followed by slews in altitude, with me recentering the streetlight each time. This was the first time I've ever found a streetlight helpful in astronomy, by the way! That was it. According to Autostar, we were ready to go.

Despite thickening clouds, Pat and I moved the scope down to his observatory, hoping it might clear up enough for us to do *something*. After a few minutes, it did indeed clear enough so that I could see Polaris. It was time to align the scope and its Autostar. The first step in alignment is to place the 125 in "home" position. To do this, you position the scope so the control panel on the base is facing west. When the base is properly positioned, the tripod is leveled and the scope azimuth lock is released. With this azimuth (RA) lock off, the scope is turned in a counter-clockwise direction until it hits the azimuth "hard stop." This stop prevents the scope from turning so far in one azimuth direction that it winds-up (and snaps) the internal wiring bundle that runs from the drivebase to the fork mount. The scope is then turned clockwise until it's pointing north (use Polaris as an indicator of North, *not* a compass). Once pointed North, the scope tube is leveled. Assuming the declination circle is accurate (you can adjust it if it is not), you can simply move the scope until the declination circle reads "0".

After the scope is in home position, you can begin the "real" alignment, which involves pointing the scope at two stars. The simplest way to do this (and often the most effective means) is to use "Easy Align". In this mode, the scope chooses two stars, points at each, and has you center each star in the eyepiece. Pressing "enter" after centering the first star moves the scope to the second luminary.

OK, Easy Align it is. The scope chose Sirius, and, with a hum of its motors (the motors are a bit loud when slewing at the scope's highest speed, but not disturbingly so), the 125 set off for the Dog Star. When it stopped, I knew it was *Houston, We've Got a Problem* time.

The Autostar 497...

While the scope was pointing correctly in azimuth, it had not moved in altitude. At all. The tube was still level. I did all the usual things: checked the altitude lock knob to be sure it was secure, redid the alignment procedure, even tried resetting the Autostar computer. Nada. Zip. Zilch. The scope simply wouldn't move in altitude. Not even when I pressed the Autostar's Up and Down direction keys. I was at a loss.

Pat suggested we move the scope back into the house and take a look at it in more comfortable and brightly lit surroundings. Inside, we tried everything again. No dice. Tried a fresh set of batteries. Uh-uh. Then I had a brainstorm: "Pat, bring me the electronic controller." We plugged in the manual controller and the symptoms were the same. No altitude movement. I began to feel relief. As all the scope's electronics are in the Autostar, the malfunction couldn't be *too* serious.

With renewed enthusiasm I removed the scope's bottom plate to gain access to the drive base (via three phillips head screws). In a second, I saw the problem. An electrical connector had become unplugged. I snapped this back on and replaced the base plate. Success! The scope moved eagerly in altitude with both the electronic controller and the Autostar! What caused the cable to become disconnected in the first place? It went back on its connector in such a positive fashion that I can't believe it was dislodged in shipping. More likely, it was not firmly plugged-in during assembly. Stuff happens, I guess, but this was a disappointing QA lapse. Just as you'd guess, by the time we had the scope going again the clouds had returned with a vengeance.

I didn't think much about the ETX for a few days. We were suffering under another deep south weather system with clouds everywhere. But they finally departed and I got an excited call from Pat. Despite only having used an Autostar a time or two before, Pat had easily gotten the ETX aligned and operating. The little scope had placed every single object in the somewhat narrow field of the 26mm Plossl (the 125 is a rather long focal length scope at f/15). But this silver cloud had a dark

lining. Pat said he'd concluded that the scope fork was *much* less stable than we'd hoped. This didn't sound good, but I resolved to head over to Pat's at the very next opportunity and see for myself.

Back at Stargate Observatory, I did rather quickly see for myself the problem Pat had described. The ETX, like the 90, is equipped with a fork mount made *entirely* from ABS plastic. No metal whatsoever. Not only is this fork made of plastic, it is quite thin. It is actually thinner, as we noticed later, than the similar plastic fork on my small ETX-60! Pressing lightly against the fork with a finger causes immediate and very noticeable side-to-side flexure. On calm nights, this is not a problem. But on windy evenings this thin mounting tends to make the scope vibrate continuously. It also makes focusing an exercise in patience.

Touching the focuser causes considerable vibration. A light touch or a Meade Electric Focuser is a *must*. Further investigation revealed that even a light rap on the tube causes shaking that takes about 5-6 seconds to die out. Not *outrageous*, but certainly shakier than the scope could be. The ETX 125 would have been much steadier, in my judgment, if Meade had given it a fork made at least partially of metal attached to a metal drivebase top (this too is plastic).

There's just no way around the fact that steadiness is an issue with the 125. You can't do anything about the fork's flexure without performing major surgery on the scope and voiding your warranty. But you can try to eliminate any sources of vibration other than the fork. A hefty tripod, for example, can help keep the 125's vibrations at least bearable. Since this donated scope was not supplied with a tripod, Pat used the aluminum tripod from a Celestron CG5 mount. This is about the *minimum* for this scope.

Well, no, the scope wasn't as solid as we'd hoped. But not unusable. How would the scope perform otherwise? How well would the goto work? And what kind of images could the ETX deliver? I needn't have worried about goto. Despite rumors and stories I'd heard on the Internet, the 125 did indeed find deep sky objects "first time every time." Following an admittedly casual and hurried alignment (Pat and I had CCD work to do with his C8), the scope placed every object I requested somewhere in the field of a 26mm eyepiece. I really couldn't have asked for more in this regard. The scope also tracked well, even at high power. I did detect a bit of "creep after beep"—movement of the object in the field after a goto. But it was minimal and not disturbing. I understand that Meade is currently working on this software problem.

Images? I always expect a lot from Maksutovs. They have a reputation for quality, and the 90mm ETX has continued this tradition. How good *is* the 125? Very good. Maybe not as *spectacularly* good as the 90, but excellent nevertheless. Stars were pinpoints with a first diffraction ring readily visible at high power and a very subdued second ring. How would I rate the scope? Similar to, and maybe slightly better than, Celestron's legendarily good C5 optics. In a way this is not surprising. The secondary baffle on the ETX 125 gives it a central obstruction similar in size to a C5's. I did find Jupiter sporting slightly more detail than I'm used to in a C5. I also thought that the background sky looked slightly darker, and that the contrast was a little better than in your average 5 inch SCT. All images snapped into focus (the **snap** would've been even *more* noticeable without the shaking caused by touching the focus knob). Due to poor seeing, a star test was problematical, but from what I could TELL the optics looked good, with perhaps a touch of undercorrection.

To sum up? The scope was both better and worse than I'd heard. Computer-wise, we did not experience *any* of the rumored debilitating problems concerning goto. I feel the "secret" to making the ETX work as designed is twofold—you must have the most recent Autostar software release, as this cures a host of problems. You must also take care to place the scope properly in home position. Using a bubble level to level the tripod will also significantly enhance goto accuracy. Careful initial drive training may also make a difference in some cases, as Meade suggests, but I didn't have any trouble finding objects with an essentially "untrained" scope. In the course of troubleshooting the altitude problem, I wiped out my training, but this didn't seem to hurt "gotoing" at all.

Would I buy an ETX 125? *I don't know*. Maybe if the price for the system (scope, Autostar, tripod) could be moved away from the 1000

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dollar mark to 700 bucks or so. The thing is…this scope is really *neither fish nor fowl*. It's too bulky and heavy to serve as a quick-look grab 'n go scope like the 60, 70 and 90mm ETXes. And it's a bit deficient in the aperture department to serve as a primary-use scope. 1000 dollars will, you see, get you a significantly more capable CAT—like the 8 inch Meade LX-10. But, I gotta tell you…it was **easy** to forget these practicalities while the 125 was happily humming as it moved from object to object, showing me countless wonders at the mere press of a button!

Grand First Annual SCT-User Astrophotography Competition!

Rules:

1. The Competition is open to all members of the sct-user mailing list. Images must be taken/guided with a Schmidt Cassegrain, Maksutov Cassegrain or Maksutov **Newtonian Telescope.**
2. Entries must be received by 0 hours GMT on 30 June 2001.
3. All entries must be submitted electronically via email to Rod Mollise RMOLLISE@aol.com
4. Categories are:
   - Best SCT/MCT/MNT Prime Focus Deep Sky Astrophoto.
   - Best SCT/MCT/MNT Planetary (Solar System Object—planet, comet, etc.) Photograph.
   - Best Piggyback Photo (any subject) Guided with an SCT/MCT/MNT.
   - Best CCD Image Taken with an SCT/MCT/MNT (any subject).
   - Best Beginning Image (photo or CCD) with an SCT/MCT/MNT by an Imager with One Year's (or less) experience.
5. Entries will be judged by a panel to be announced.
6. ONE ENTRY IN EACH CATEGORY ALLOWED PER PERSON. For example, a novice imager could submit 5 images, one in each of the above categories. Imagers with more than one year's experience would be limited to 4 images for submission.
7. Winners (top three in each category) will be announced on/by July 15 2001.
8. Computer image processing is allowed for all entries, but processing applied to image must be described in the entry form below.
9. Winners will be notified by email and will receive a certificate or other awards to be determined/announced.

Entry Form: Contact Rod Mollise for an Entry Form. Entries will be submitted via email with the form being the text of the message, and images sent as attachments. ONE IMAGE PER EMAIL ONLY! If you intend to submit more than one image, each image must be sent separately!

SCT Collimation

Rod Mollise

Collimation. When do you do it? How do you do it? Why do you do it? Does it feel good? Is it legal if you're under 21?

*Truth be known, collimating an SCT if fun 'n easy. Much nicer than adjusting the optics on a big dob. And, by God, is it **critical** for good CAT performance! The difference between a collimated and an uncollimated SCT, especially on critical subjects like planets, is like night and day! Really! Unfortunately, many new CAT owners seem intimidated by this simple process.*

Basically, it's **a two-part process.**

Rough Collimation:

Set-up the scope and put a medium bright star in the field of an eyepiece. Polaris would be a nice choice. Defocus a lot until you have what looks like a round "globe" or blob of light with a dark center. Does the dark spot (actually the shadow of your **secondary**) seem more or less centered? If it does, move on to the next step. If not, you'll need to adjust your secondary. Remove the orange 'secondary cover' if your scope has one (I believe Celestron has discontinued these covers; Meade never had 'em), revealing the adjustment screws for the secondary (either Allen head or Phillips style). Pick one and gently tighten it a little. Observe how the dark spot moves and try the screw's opposite number if it doesn't move in the right direction. Adjust the relevant screw(s) until the dark spot is reasonably centered. Always adjust your secondary by tightening the screws. Only if a screw is completely tightened and can't be turned anymore should you then loosen the opposite screw to continue movement in the same direction (never, **never force anything**, natch).

Fine Tweaking:

Ok, you've done a rough collimation using the secondary's shadow. But this *ain't* good enough, especially if you like to look at planets. Let's do a fine collimation. Replace the eyepiece you've been using with one that yields around 200x or so. Move the star *almost* into focus until you see a series of **diffraction rings** (or more properly for a defocused star, *Fraunhofer* rings**)**. Is everything centered? Does the combination of airy disk and rings look like a perfect little bullseye? If yes, you're done. But if the rings seem 'skewed' to one side or

another, you've got more adjustin' to do, pardner. Adjust your secondary (by very small amounts) as above until the rings are concentric. When you adjust the secondary, this will decenter the star in your field. Always recenter the star carefully before making a further adjustment. Keep on goin' until you've got a nice little bullseye with everything centered.

Want to get things adjusted even better? Well, if you've got a really good, steady night, you can go to Stage 3, collimating by observing the airy disk and diffraction rings of a star IN FOCUS. To do this, you'll probably have to run the power up to at **least** 300x. What you'll see in focus is the Airy disk surrounded by a prominent (but tiny) first diffraction ring (other diffraction rings may be faintly visible. If your collimation is dead-on, the first ring will completely surround the star. If you're off, it will appear **broken**. Move the collimation screws in very small increments until the first diffraction ring is complete.

Should you collimate with your star diagonal in the scope? This is controversial, since poorly made diagonals can affect collimation. But my gut feelin' is that you should collimate with the diagonal if you plan on using it during your observing runs.

Once collimation is complete, most SCTs hold it very well. But DO check it every once in a while!

Rod to SCT user:

"Hmmm...looks like you may be a little off in collimation."

User:

"Well, I collimated it a couple **of years** back. Haven't worried about it since. SCTs are supposed to stay in collimation, ain't they?!"

My Back Pages

Club Notes

MAS

The MAS held a very successful Public Star Gaze in association with the Environmental Studies Center on Thursday night, April 26. Well over 100 children were treated to views through the telescopes of the Mobile Astronomical Society. This was a particularly important event given the school funding crisis. It was great to be able to show off the ESC and the wonderful work Dianne, Lloyd and Mike are doing for our county's schoolchildren. Remember to get out and vote on May 15!

SCT-USER

Two big news items for the sct-user mailing list this time. First, Joe Hartley has been appointed Assistant List Moderator. Besides his expertise in SCTs, telescopes and astronomy, Joe is a great resource on anything having to do with computers. Very handy in these days of high tech astronomy!

The other item of note is that the 2001 sct-user Imaging Competition is underway! See the article in this issue of Skywatch for details!

Their TV show may be gone, but the witless duo, Beavis and Butthead (heh-heh, heh-heh) live on in the pages of Skywatch! These two delinquents are entrusted with delivery of the monthly hermetically sealed mayo jar containing the latest batch of…

Rumours

Where's that Nexstar 11?! We were originally told by Celestron to expect its goto/gps marvel by the end of April. Unfortunately, we've now heard that this new scope's introduction has been put off to June "at the earliest". Apparently, Celestron is modifying the scope to include manual RA and declination locks ala the LX-200, so the scope can be pointed manually and operated without power. As is the case with the LX-200, moving the scope manually *will* cause it to lose its computer alignment. But I think this is really a good thing, as I've never liked the lockless "clutch" system Celestron used on the Ultima 2000 (too many balance problems). And also I don't like the fact that the Nexstar 8 and 5 can't be used without power. The Anonymous one has also heard that Celestron is working "a few bugs" out of the software. We'll see what *that* means! Oh, and supposedly the scope now looks slightly different than it did in the prerelease pictures we've seen.

Chinese heavy duty mounts? The EQ-6, the latest mount from Synta, one which will be substantially heavier duty than the CG-5/EQ-4, has *still* not appeared. This bargain GEM, which will have a goto option, is now slated for delivery by the end of the year. Maybe it's a good time for Synta to hold off. There was quite a bit of anti-China sentiment visible on s.a.a. following the EP-3 downing…

Nagler Type 6es…Yes, Uncle Al is preparing to release a new batch of Naglers, this time at the shorter focal length end of the range. How much? Well, if you have to ask, you can't afford it, for sure. But you can bet that the hard-core types will gravitate to these new "space-walkers" like bees to honey no matter how much TV charges! There has been some carping on s.a.a. about the fact that TV eyepieces now sell for the same price at ALL dealers. But I'll bet this hasn't stopped anyone from buying 'em. There is really no substitute for the Nagler!

The Anonymous Astronomer