MEADE'S 12" RCX400 TELESCOPE

INTRODUCTION

Few (if any) new product introductions have created quite the stir that Meade's RCX series did. Of course, Meade went out of their way to help things along with their pre-announcement that a new model would be announced shortly and that it would have a major impact on amateur astronomy. This created plenty of buzz on the various astro Groups and Fora as to just what the news would be. When the details were released, the buzz only grew larger. It was described as an "Advanced Ritchie-Cretien" telescope on a dual-arm forkmount similar to that used on current LX200GPS models. Since the existing RC models on the market are in the lofty price classes and chosen for use by some of the most serious imagers in amateur astronomy, this raised three issues.

One question frequently raised was just what Meade had in mind producing an obviously imaging-optimized telescope on a forkmount instead of the far more commonly-used German equatorial mounting? How could it match the performance of the $8000+ GEMs used by imagers? A check of the prices offered made those answers clear; this series was aimed at a lower price point; a complete 10" RCX system cost considerably less than most high-end mounts alone. It apparently was intended not to compete with the highest-end gear, but instead to fill the gap between the forkmounted SCT's and the premium imaging setups - at a price of about double that of current SCT offerings.

Another issue related to optical quality - how could a 10" complete system for $5000 match a conventional RC when a 10" RC optical tube from RCOS costs $13,000? Again, the answer is apparent to me. Despite some of the marketing language used, it's not meant to compete, but to make enhanced imaging performance available at a performance and price point attractive to a different (and presumably much larger) market. Whether it can do that is a much more interesting question.

The third topic generated by far the most activity. What was Meade doing describing this as an Advanced RC when it's not identical to a conventional RC? The actual optical design wasn't described by Meade for some time, permitting folks to embark on an orgy of uninformed speculation as to the optical configuration. Some such speculations were published so widely and in such an authoritative tone that confusion remains, despite the fact that the configuration is now well-documented. For the record, the system consists of a hyperbolic secondary (as in a conventional RC) and a spherical primary with a new design of corrector lens (NOT a Schmidt corrector) added; the combination of the corrector and the spherical primary behaves much as a hyperbolic primary by itself would. That's the RC connection - a conventional RC uses two hyperbolic mirrors.

Not surprisingly, I was curious about this offering. I've owned and used most of the forkmounted SCT's currently offered, and have dabbled at imaging for a while. I wanted to see if this series would provide a performance boost above the SCT's without requiring the investment involved in a higher-end imaging platform. When Astronomics offered to provide a 12" for review purposes, I cheerfully volunteered. I had just

removed a 12” Meade SCT from the observatory, so I figured I’d have a pretty good feel for comparing them visually. I had taken enough recent images that I’d be able to repeat the shots with the RCX for direct comparison.

WHAT IS IT?

As mentioned above, the RCX400 series consists of optical tubes and mounts bundled together. It’s currently offered in apertures of 10”, 12”, and 14”, with a 16” version in the works. The Giant Field Tripod has been replaced by a new unit that looks to be even more stable than the GFT, with the added benefit of removable legs for portability. Despite the imaging orientation of this model, it is not provided with a wedge, but is compatible with the Superwedge and others in the market. Due to the base design and to the extra hardware associated with the focusing system, the RCX models weigh significantly more than the corresponding SCT models. For example, a 12” LX200GPS weighs about 75 pounds, while the 12” RCX400 comes in at a hefty 91 pounds. In the 12” version, this is offset to some degree by the fact that the shorter optical tube of the RCX can be parked between the forks rather than remaining pointed upwards during setup as required by the 12” LX200GPS.

The optical tube is the most innovative portion of the setup. The tube itself is made of carbon fiber (used to reduce focus shift with temperature changes). A cooling fan and dew heater are incorporated into the OTA. Like an SCT, the secondary mirror is mounted to the corrector plate, but unlike an SCT the primary mirror is fixed. Focusing and collimation are achieved by moving and tilting the corrector plate - and thus the attached secondary mirror - by three servomotors via carbon fiber shafts. The apparent intent is to provide very smooth, repeatable focus action with no image shift. A collimation preset can be stored, as well as several focus positions. That’s a lot of extra hardware and electronics; the longterm reliability of these items won’t be known for a while.

The mounts are derived from (and very similar to) the 14” LX200GPS mount. Like the LX200GPS, they offer a large library of targets for GoTo operation, periodic error correction in both RA and DEC (referred to as Smart Drive), multiple-object mapping capability (Smart Mount Technology), provisions for autoguiding via either a serial port or an autoguide port, High Precision Pointing, and compatibility with the Drizzle feature of the Deep Sky Pro imager’s software. Firmware and object updates can be done by the user from materials available on Meade’s website, although no firmware updates have yet been released for the RCX series. Unlike the LX200GPS, the drivebase also includes a USB hub and interface permitting the telescope and one or more imagers or guiders to be controlled via a single USB cable. It also includes controllers for the optical tube’s built-in dew heater, the cooling fan, and the motors used for focusing and collimation. Substantial internal cabling permits the ancillary USB devices and the guider to be connected at the optical tube rather than at the base, reducing cable clutter and tangling opportunities.

SO WHAT DO YOU GET?

The telescope box is much smaller than that in which the 12” LX200GPS is shipped. This means that Fedex Ground can be used to ship these. That’s both less expensive and more convenient than freight. This one was shipped from Astronomics. Everything appears sealed and not repacked so I’m gonna consider it a random, non-selected sample.

THE TRIPOD BOX

The tripod box is square and squat rather than the tall, thin box used for the Giant Field tripod. This is due to the fact that this tripod doesn’t permit the legs to be unspread; the legs are removed instead.

The box is not so sturdy as the GFT box was; this one arrived with one corner split.

Nothing was missing or damaged, fortunately.

Opening the box reveals the feet - just as with the GFT

Here are the legs and tripod head ready for assembly (gee, that Styrofoam debris didn't look that bad without the flash!).

The tripod legs are slid onto the leg segments and the leg attachment locking levers tightened. That's it; the tripod is assembled. As can be seen in the photo on the right, the leg adjuster release levers simply hook onto the release arms. And what's this? I see that Meade has implemented a springloaded center bolt, similar to the popular "Springy Thingie" LX200 accessory. We'll see pretty soon if that's a good thing.

THE “EVERYTHING ELSE” BOX

Unlike the LX200GPS scopes, the inner “beauty” box doesn’t slide into the outer box Both open the same way, so both top sections can be removed at once, revealing the top layer of packaging material. Removing that material reveals the telescope and accessory box. The foam is the kind that’s sprayed into a plastic liner rather than the diecut foam used with the LX200GPS series. It protects during shipping at least as well but would be less convenient to re-use in a transport container for portable telescope use. To me, this isn’t a portable setup anyway.

ACCESSORIES

Let's look in the accessory box first.

In that box are:

the Autostar II controller (same as the one used with the LX200GPS) ·

the finderscope - it's extra nice, with the focuser at the eyepiece end where it belongs

a 2" star diagonal with UHTC

a beefy 2" visual back

a USB cable

a HUGE 24mm 5000 series UWA 2" eyepiece

Autostar Suite software and USB drivers on a single CDRom

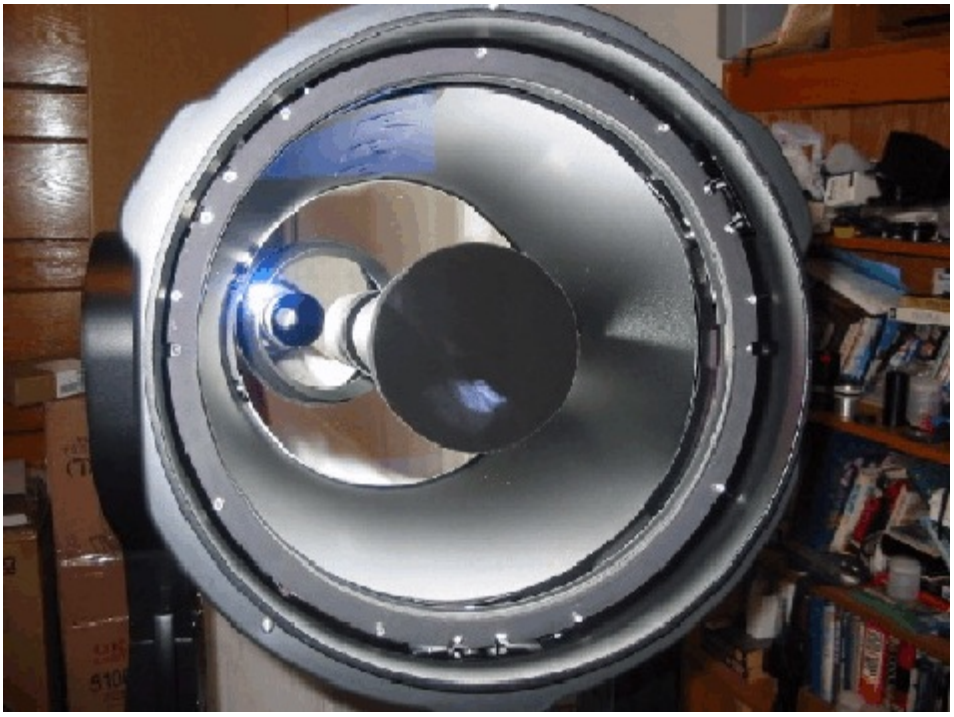
the same flimsy handbox holder as is supplied with the LX200GPS.

Hmmm. No AC supply or DC cable. Like the LX200GPS, there are primary battery holders in the fork arms so I guess they figure that's sufficient. As with the LX200GPS, I have no intention of trying that -I'll use the jumpstart packs and DC cables I already have.

THE TELESCOPE

Now comes the moment of truth. This thing is heavy; at 91 pounds it's about 15 pounds heavier than a 12" LX200GPS. My hope is that it'll still be easier to assemble to the tripod because the shorter optical tube parks between the forks like the smaller SCT's. It turns out that it IS easier to mount than a 12" LX200GPS. I lifted it out of the box and onto the tripod fairly easily. The springloaded center bolt made it unnecessary to place it perfectly; I just plopped it on there and slid it around a bit until the bolt snapped up into place. The large, comfortable handle made tightening the bolt into the telescope base quick and easy. On the other hand, the fork arm handles are just as poorly placed as they are on the LX200GPS models - but at least the balance is much closer. There's lots of room between the telescope base and the drive base for hardware; about 2.5" more room than is available on the 12" LX200GPS.

The rear cell of the optical tube has an approximately 3.25" threaded fitting for optical accessories. I found that both my Moonlight crayford-style focuser and a Lumicon Giant EZ-Guider fit just as they would on a 10" or larger Meade SCT. A reducer is supplied with the RCX that takes this down to a standard SCT thread fitting. All the standard SCT accessories I tried fit the reducer normally. The RCX is also supplied with a surprisingly massive 2" visual back which attaches to the reducer and accepts the supplied refractor-style 2" sories.



Those UHTC coatings really make the corrector disappear!

Here’s the OTA rear, showing the connections available there.

This detail shows the massive tripod head and the leg level release levers

The carbon fiber tube (with Meade blue fibers!) is attractive. Note the manual slow motion controls - you won't be able to focus this baby without power but you can move the tube around!

This photo is included just for scale (honest!).

INITIAL CHECKOUT

Fit and finish are great, just like the LX200GPS models I've owned. I see no cosmetic flaws and everything that must be assembled went together fine except the finderscope holder; a little paint on the dovetail kept it from going into the base until I scraped it a bit. I really, really like the new tripod. I see that there are no accessory mounting holes at the top center of the optical tube, meaning that I won't be able to add a guidescope using hardware lying around here. That may hold me back a bit later in evaluating its imaging potential. I don't know whether dedicated hardware is available yet for this model. There are tapped accessory holes that would accept radius blocks such as are supplied with Losmandy dovetails so I presume that if those aren't yet available they soon will be.

Applying power from my jumpstart battery, everything came up just as it should.

Running the focuser back and forth I noticed that it seemed fairly loud at high speed. I suspect it won't be used at high speed very much, though. Digging through the menus I found the dew heater and OTA fan under "Utilities"; that seems an odd place but now I know where they are. Unlike the 7" Meade Maks, which use two fans, this model uses only one, which draws filtered air into the rear of the tube and exhausts it out the front. Slewing around a bit, it the drive motors sounded similar to the LX200GPS (as expected).

I did my usual indoor alignment; I pointed the optical tube North and the control panel

South after ensuring that it was midway between the hard stops. Upon being told to do an automatic alignment, it did the usual “Meade Mambo”, checking level at three orientations, then seeking North and level. At this point it wanted a GPS lock. As with all the other GPS-equipped telescopes that have been in my dining room, I couldn’t acquire an indoors GPS lock. I entered time and location manually and off it went to the first alignment star. I told it that it was centered and it slewed to another. I told it that one was centered also, and received an “alignment successful” message. A few GoTo requests resulted in pointing attitudes that were reasonable, so I pronounced it functional. I strongly recommend this sort of thing with a new instrument, as if there’s a problem either with the telescope or the operator it’s easier to sort it out in a well-lit room.

I’m not going to draw or report any conclusions at this point; I haven’t even looked through the telescope yet! What I can say is that so far everything seems to be as it should be. If it works as well in the observatory as it seems to in the dining room it’ll be a very nice instrument.

TAKING IT OUTSIDE

The next step was to haul it up into the observatory and plant it on the wedge there. I made sure I had help with that phase of the project. It’s definitely a two-man job - but I believe that it’s easier than either the 12” or 14” LX200GPS. As you can see in the photo, the soft dewshield from my current 12” LX200 Classic fit the 12” RCX just fine. The dustcap is also the same size, as is the prefilter for my Ha filter setup.

Clearly, most of what we really care about will be learned in the next phase of this trial. I’ll be able to see how well it operates compared to the various Meade & Celestron forkmounts and GEMs I’ve used in this observatory. I’ll evaluate goto and tracking accuracy. I will be able to measure and evaluate periodic error and periodic error correction. I will be able to take some images with the Canon 300D DSLR and the LPI,

and to compare them directly with those I have taken using the same cameras and the 12" Meade SCT. I'll be able to check focuser range with binoviewers. I'll see how the views are in the eyepiece, and how they compare to what I'm accustomed to in the SCT.

In addition, I'll be able to get a feel for just how well all the extra technology works together. I want to see if it gets in the way, or makes it easier and more convenient to use. I'll also watch for any functional oddities with the newer and untried features.

Finally, if time and weather permit, I'll take it out into the field and see what setting it up in altitude/azimuth mode on that great-looking tripod is like. It should be of interest to the folks wherever I take it!

John Crilly
7/8/05
jcrilly@neo.rr.com