# Meade® 7", 8", 10", and 12" LX-Series Catadioptric Telescopes

## Diffraction-limited Schmidt-Cassegrain and Maksutov-Cassegrain optics, assembled into advanced electromechanical systems.

The large apertures of Meade LX-Series catadioptric (mirror-lens) telescopes permit the use of higher observing magnifications than is the case with smaller instruments, and because of the telescopes' greatly increased resolution and resolving power, extremely fine celestial detail may be observed and photographed. The four principal satellites of Jupiter become finite-sized orbs rather than pinpoints; the planet itself, under favorable atmospheric conditions, is an intricate web of whirls, festoons, and discontinuities. Saturn's rings resolve into finer detail, with at least 3 rings observable, and with detectable color variations. Six of Saturn's satellites are visible in revolution about the planet. Numerous features of the Martian landscape, including the white polar cap, are clearly identifiable. The Moon is a veritable treasury of incredibly fine fault lines, craterlets, and rilles. Deep-space phenomena take on a new character when explored through the tremendous light gathering capability of the 8", 10", and 12" models. Galaxies merely visible in smaller telescopes begin to show their essential structure; globular star clusters are resolvable in fine detail, in some cases to the core of the cluster; diffuse gas clouds such as the Orion Nebula are visible in such wide extension that the nebulosity may fill the field of view. This listing only hints at the breadth of galactic and extragalactic objects visible through the eyepiece of a Meade 8", 10", or 12" SCT model: it is a rare observer who might in a lifetime view all of the enumerated phenomena in the above categories.

**Meade 10" LX200GPS Schmidt-Cassegrain;** shown with standard-equipment microfocuser and Autostar II hand controller and with optional Superwedge. The telescope's primary mirror lock-knob is located on the rear cell, above the manual focus knob.


**The Pelican Nebula (IC 5070) in Cygnus.** A 90-minute exposure by Philip Perkins with the Meade 10" LX200 Schmidt-Cassegrain.

**Meade Schmidt-Cassegrain Optics:** In astronomical optics the term *diffraction-limited* is used to rank an optical

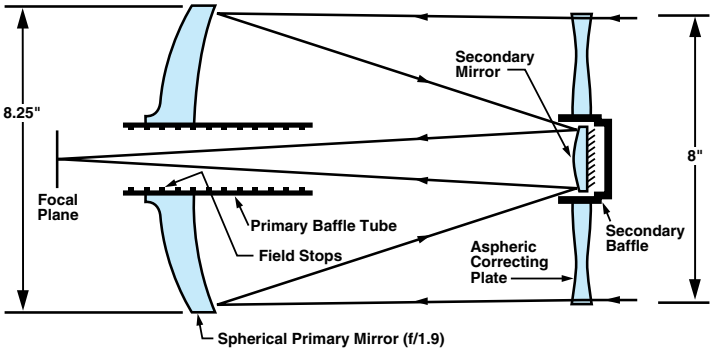
*"Over the past few days I have put my new 10" LX200GPS through exhaustive testing, optically, mechanically, and electronically. My conclusion is simple: this is without question the most advanced amateur telescope I have yet used (and I have used many), an elegant and important evolution of the LX200 I previously owned. In terms of pointing precision, optical resolution, electronic sophistication, and almost every other significant feature one could imagine — not to mention ease of use — the telescope is simply miles ahead. I have tried hundreds of slews to objects in the database and every one ended up with the object pinpoint-centered in the field…The value of the microfocuser is difficult to overstate: images of the Moon and Jupiter, for example, are very tightly focused; extremely precise focusing in both visual and CCD applications is now easy to accomplish. GPS alignment is very accurate and of real assistance in getting the scope up and running quickly each night. For CCD imagers like me, the primary mirror lock has finally, and completely, resolved the issue of mirror shift during focusing…This is just a magnificent astronomical instrument."* **— John E. Hoot, San Clemente, CA.**

system as being of professional quality. Simply put, diffraction-limited means that the performance and resolution of an optical system are limited only by the size of the theoretical stellar diffraction image — *i.e.,* limited only by the inherent aperture of the system and by the laws of physics — and that no additional performance improvement is physically possible. Meade hand-matched Schmidt-Cassegrain optical systems — in continuous, independent, random tests by advanced amateurs and in definitive test reports by leading astronomical magazines (*e.g.,* see p. 32) — are consistently ranked as diffraction-limited. That Meade Schmidt-Cassegrain optics carry such a reputation worldwide is perhaps the prospective purchaser's best assurance of optical quality.

**Astrophotography:** Many Meade Schmidt-Cassegrain owners have done fine, high-resolution photography of the Moon, planets, and deep-space, as the photos on these pages confirm. A large complement of optional accessories, pp. 54 - 55, as well as the Meade Pictor 201XT CCD Autoguider, p. 90, is available for virtually every type of photographic application.

**CCD Imaging:** Meade CCD imagers create a multifold increase in the effective aperture of any Meade telescope and enable the imaging of the planets and deep-space objects with a level of resolution and detail heretofore impossible to achieve. See pp. 82 - 97 for information on these Meade electronic instruments that have opened up entire new capabilities for both the beginning and advanced amateur astronomer.

**Meade LX10, LX90, and LX200GPS Schmidt-Cassegrain Series:** Meade Schmidt-Cassegrain telescopes include a wide range of features and specifications, permitting a choice of telescope precisely tailored to each buyer's requirements. The respective tube assemblies of LX10, LX90, and LX200GPS models utilize identical optical systems. Differences among the various models lie primarily in the relative levels of mechanical and electronic sophistication. Detailed descriptions of all models are presented in pages 28 through 49; basic model concepts are as follows:




In the Schmidt-Cassegrain design of Meade 8", 10", 12", and 16" models, light enters from the right, passes through a thin lens with 2-sided aspheric correction ("correcting plate"), proceeds to a spherical primary mirror, and then to a convex secondary mirror. The convex secondary mirror multiplies the effective focal length of the primary mirror and results in a focus at the focal plane, with light passing through a central perforation in the primary mirror.

Meade 8", 10", 12", and 16" models include oversize primary mirrors (*e.g.,* the primary mirror of the 8" telescope is 8.25" diameter), yielding fully illuminated fields-of-view significantly wider than is possible with standard-size primary mirrors. It is this phenomenon which results in Meade Schmidt-Cassegrains having off-axis field illuminations about 10% greater, aperture-for-aperture, than other Schmidt-Cassegrains utilizing standard-size primary mirrors. Field stops machined into the inside-diameter surface of the primary mirror baffle tube significantly increase lunar, planetary, and deep-space image contrast. These field stops effectively block off-axis stray light rays.

**8" LX10 Schmidt-Cassegrain:** Responding to the demand for a relatively light weight, moderately-priced 8" Schmidt-Cassegrain, the Meade 8" LX10 is nonetheless fully qualified as a serious instrument. The LX10 operates for over 50 hours from its internal battery-powered motor drive system. The standard-equipment hand controller enables precise 2x guiding corrections in Right Ascension during long-exposure astrophotography; corrections in Declination may be effected from the same hand controller by adding the optional Declination motor.

**The planet Saturn.** A CCD image with the Meade 10" LX200 Schmidt-Cassegrain by António Cidadão of Oeiras, Portugal. *(See p. 33 for additional planetary images by Mr. Cidadão.)*

**8" LX90 Schmidt-Cassegrain:** Announced in June, 2000, the Meade 8" LX90 Schmidt-Cassegrain is the first full-capability, computer-controlled 8" Schmidt-Cassegrain ever offered in its price range — a telescope that includes many advanced features:

*Dual-Axis worm-gear drive system:* With 4.9"-diameter gears for smooth sidereal-rate tracking and slewing, the LX90's microprocessor-controlled drive system allows for precise long-exposure photographic or CCD imaging.

*Autostar Computer Controller:* Use Autostar to GO TO any of over 30,000 celestial objects in the LX90 database or to any object of known RA and Dec., automatically, at the push of a button and at a speed of 6.5°/second on both axes, simultaneously. The telescope's pointing precision is a remarkable 5-arc minutes or better.

*Nine selectable slew speeds:* Push the Autostar speed button to change dual-axis speeds from a slow 1x sidereal to a fast 6.5°/second in any of nine increments.

*Die-cast aluminum, double-tine fork mounting:* The LX90's fork mounting yields all of the rigidity required for advanced

**The Orion Nebula (M42).** Chuck Kimball captured this fine photographic image with his Meade 10" LX200 Schmidt-Cassegrain using hypered Kodak PPF-400 film. The telescope was autoguided throughout the 30-minute exposure by the Meade Pictor 216XT Autoguider/Imager *(p. 92)*. Writes Mr. Kimball: "Since my workload hasn't permitted me any darkroom time, this is a raw, unmanipulated print done at the Price/Costco one-hour lab near my home."

applications of the telescope, from high-power, high-resolution visual observing of the Moon and planets to long-exposure astrophotography or CCD imaging. A 3-connector control panel is integrated to one of the fork arms.

*Variable-height Standard Field Tripod:* Consistent with the mechanical standards of the LX90 system, the chromed-steel Meade Standard Field Tripod (the exact same tripod included with Meade 8" and 10" LX200GPS models) provides rock-solid support for the telescope.

*Cordless operation:* Power the telescope from eight (user-provided) C-cell batteries located internal to the telescope's drive base.

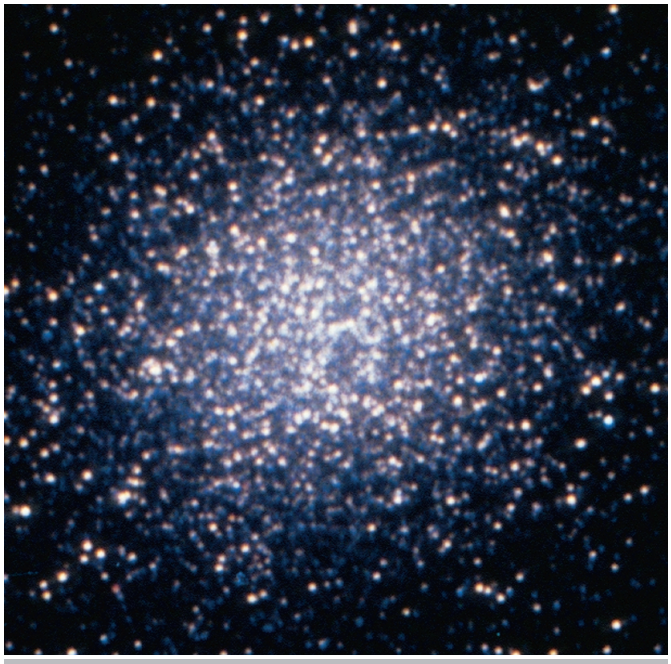
**Control panel** of Meade 7", 8", 10", and 12" LX200GPS models.


**LX200GPS Schmidt-Cassegrains:** Meade 8", 10", and 12" LX200GPS Schmidt-Cassegrains, announced in September, 2001, present to the serious amateur instruments ready for an amazing array of state-of-the-art capabilities. Built into the new LX200GPS fork mounts — the strongest, most rigid mountings available on Schmidt-Cassegrains of these apertures — is one of the most advanced electronic packages ever offered, at any price, in a commercial telescope, an electronic package that makes using these telescopes a revelation, for the beginner or for the most experienced observer. Imagine being able to select any of over 145,000 celestial objects — objects that include entire

**Saturn emerging from behind the Moon,** during the occultation of November 3, 2001. Etienne Bonduelle of Cambrai, Northern France, obtained this remarkable image with his Meade 8" LX90 Schmidt-Cassegrain using a webcam adapted to the telescope. Comments Mr. Bonduelle: "The LX90 is really a fabulous telescope. Optically and mechanically, it provides everything I need in my high-resolution lunar and planetary work."

catalogs of galaxies, nebulae, star clusters, double stars, and variable stars, as well as all eight of the major planets from Mercury to Pluto — and, at the push of a button, having the telescope automatically move to the object and center it in the telescopic field to a precision of one arc-minute.

Meade LX200GPS models perform such feats of pointing precision time after time, on object after object, enabling the user to observe or photograph extremely faint galaxies, for example, at the very limit of the telescope's capability, knowing that the object is precisely located at the



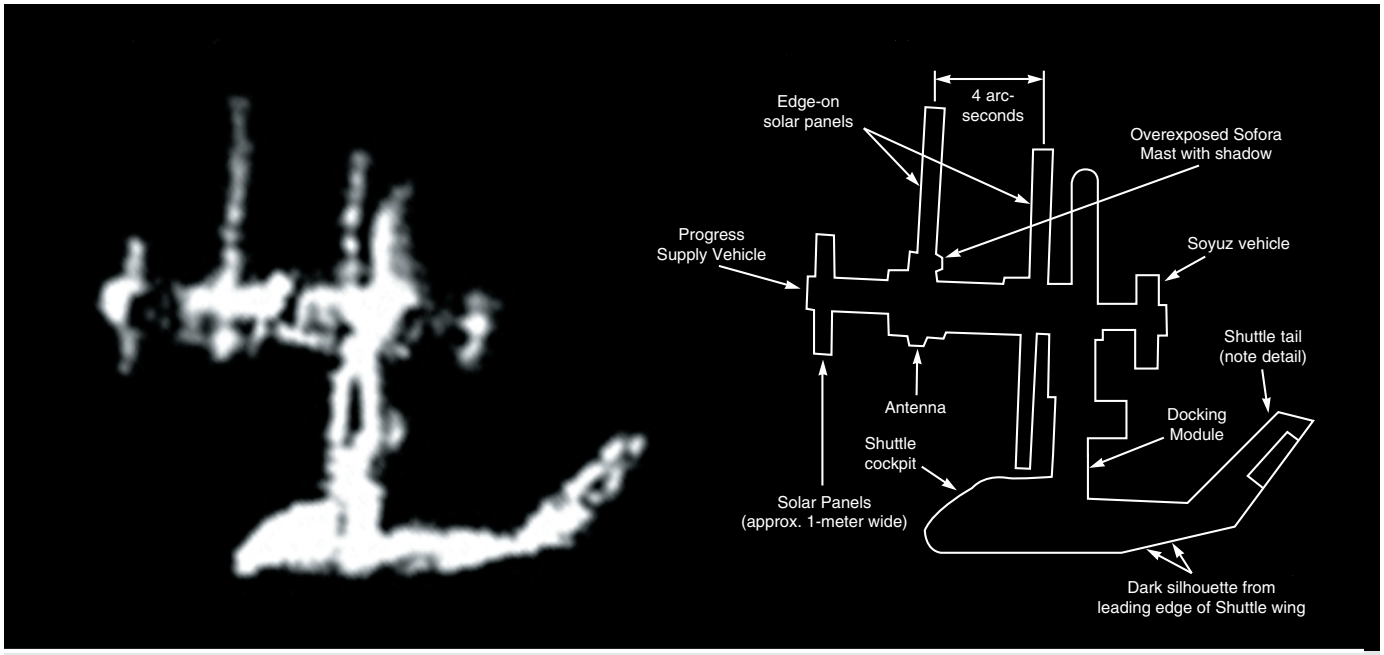
**The Omega Centauri Globular Cluster (NGC 5139).**
A 30-minute exposure by Jason Ware on Fuji HG400 film; Meade 8" Schmidt-Cassegrain telescope.

telescope's field center. Dozens of telescope functions — from changing slew speeds to automatic GO TO — can be actuated from the Autostar II hand controller. Use the 4-speed Zero Image-Shift Microfocuser, included as standard equipment with LX200GPS models, to focus the lunar, planetary, or deep-space image precisely, to a microscopic level, a level that enables the resolution of extremely fine detail often previously invisible.

**7" LX200GPS Maksutov-Cassegrain:** The Meade 7" LX200GPS Maksutov-Cassegrain exploits fully the extra-ordinary imaging characteristics of the Maksutov design. Housed in a compact optical tube assembly, the Meade 7" Maksutov optical system rivals the optical performance of even a fine *ED* apochromatic refractor, and, mounted aboard the awesome electromechanical capabilities of the Meade LX200GPS fork mounting, the telescope is a formidable astronomical tool. See pp. 36 - 37 for further details.

**Ultra-High Transmission Coatings (UHTC) Group:** As fully described on pages 26 - 27, the Meade UHTC coatings group provides, for the first time on commercial telescopes, a series of highly specialized, exotic optical coatings which dramatically increase image brightness and resolution. Averaged over the entire visible spectrum (450 nm. to 700 nm.), total light transmission to the telescope focus is increased by about 20%. Meade LX10, LX90, and LX200GPS telescopes equipped with UHTC present a quantum leap in observable detail on virtually the full range of celestial objects.

**Field De-rotater:** With the optional Meade #1220 Field De-rotater, field rotation during long-exposure photographic imaging with Meade LX200GPS models in the altazimuth mode can be fully and precisely compensated for, without recourse to an equatorial wedge. See p. 24 for complete details.




**350 miles above Boston:** Ron Dantowitz of Hayden Planetarium, Boston, Mass., used a Meade 12" LX200 Schmidt-Cassegrain optical system in conjunction with C-Sat satellite tracking software to obtain this remarkable video image of Space Shuttle *Atlantis* docked with Space Station *Mir* on November 16, 1995. At the time of the exposure the docked *Atlantis-Mir* were 350 miles above Boston and traveling at a speed of 17,100 miles per hour. The outline drawing at right points out specific features of the two spacecraft, including such details as the Shuttle's rudder and wing-silhouette. Although *Mir's* solar panels are only about one meter (39") wide, they are clearly resolved by the telescope's 12" optics, even at a distance of 350 miles. C-Sat software works with any Meade LX200 or LX200GPS model through a personal computer to locate and track automatically over 3500 Earth satellites. For further information access the C-Sat web page at www.skyshow.com. *Photo courtesy Museum of Science, Hayden Planetarium, Boston, Mass.*

**Astrophotographs by Philip Perkins with the Meade 10" LX200 Schmidt-Cassegrain telescope.** *Above:* **The Lagoon Nebula (M8) in Sagittarius;** a composite image including exposures of 60-mins. and 85-mins. The two negatives were scanned and digitally combined to form the final image shown here. *Facing page, clockwise from lower-left:* **The Horsehead Nebula (IC 434) in Orion;** composited from exposures of 90-mins., 60-mins., and 120-mins. The glare at left results from the nearby bright star Zeta Orionis. **The Reflection Nebula (NGC 7023) in Cepheus;** a composite of three exposures of 2 hrs., 2 hrs., and 90-mins. **The Rosette Nebula (NGC 2237) in Monoceros;** a composite of two exposures of 50-mins. each. **The Whirlpool Galaxy (M51) in Canes Venatici;** a composite of two photographic exposures of two hours' duration each. All exposures were taken in southern France, using hypered Kodak Ektapress Multispeed PJM-2 film.

**Philip Perkins of Wiltshire, England,** used his Meade 10" LX200 Schmidt-Cassegrain telescope to obtain this stunning series of high-resolution deep-space photographic exposures. Working in the clear, steady skies of southern France and typically taking two or more very long, autoguided exposures of an object, then scanning, digitally stacking, and processing the images, Mr. Perkins has significantly extended the level of imaged detail. Additional examples of Mr. Perkins' work can be accessed at his website *www.astrocruise.com.* Comments Mr. Perkins:

*"I believe that my astrophotographs genuinely represent what the typical user may achieve with the 10" LX200. My work has been done largely unsupervised; with a few exceptions I have not received any outside assistance in my use of the instrument. Further, my LX200 has not been modified in any way; I use it just the way Meade manufactured it, and I think the results speak for themselves. The telescope's optics, stability, and tracking accuracy — all of which are crucial in my applications — are truly remarkable, fully up to the demands that my photographic program requires. My LX200 is now nearly four years old, and during that time it has received heavy use, including 2000-mile round trips to southern France four times a year. The telescope is everything I could possibly have expected it to be."*