

## Resource Guide for Telescope Buyers

Everyone who becomes interested in astronomy eventually considers buying a telescope. Then the question arises, which one should I buy? There are many types of telescopes and many manufacturers – almost too many, making the choice a daunting one! Lacking knowledge of the field, many people buy a small and flimsy 60mm "department store" refractor at the local discount variety outlet and soon discover that the telescope is too small to observe anything fainter than the Moon and too unsteady even for that. Or, they succumb to "aperture fever" and buy an enormous telescope guaranteed to bring the most distant objects "up close and personal" – but then they never use it because it is too bulky to transport and too heavy to handle.

Many give up astronomy at that point. This is sad because with a little research it is possible to buy a telescope that is just right in terms of quality, performance, sturdiness, ease of handling and cost -- which can lead to a lifetime of night sky enjoyment. The best approach before purchasing a telescope is to visit a star party hosted by a local astronomy club. There's nothing like looking through a telescope to spark an interest in star gazing, and it affords an opportunity to ask the advice of experienced amateur astronomers.

It also helps to be a smart shopper, which means tapping into the wide variety of information available on telescopes and how to use them. The Internet has made fact-finding much easier, and there are plenty of resources available these days. That's where this write-up comes in. We've gathered together many useful Internet links to sources of information on how to buy a telescope and how to get started observing the heavens. This list of tutorials, manufacturers, merchants, books and example scopes is by no means complete, but it does serve as a starting point for education and discussion.

Use the information that follows as an entry point to becoming acquainted with the world of telescopes and astronomy and then come to a star party and talk with others who have years of experience with astronomy and telescope gear.

### **Telescope types, in order of increasing cost per aperture (size of objective)**

Newtonian reflectors – uses mirror to collect light; best value for dollars spent

Cassegrain compound optics telescopes – many variants, compact and easy to use

Refractors – uses lenses; expensive but high quality (NOT 60mm and smaller).

### **Mount types, in order of increasing cost and capability**

All except Dobsonian-mounted telescopes require a tripod and a mount head.

Mounts may be manual or motor driven (they track stars via a motor/clock drive).

- Dobsonian – for Newtonian reflectors only, no tripod required
- Altitude-Azimuth (Alt-Az) – low cost; motion in two axes required to track stars
- German Equatorial – follows natural path of stars via movement in a single axis
- Fork-Mount Equatorial – often used by Cassegrain-type telescopes
- Go To Mounts – automatically finds and tracks stars, planets, etc.

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### Astronomy magazine tutorials on astronomy

“Intro to the Sky” at <http://www.astronomy.com/asy/default.aspx?c=ss&id=157>  
Solar system <http://www.astronomy.com/asy/default.aspx?c=a&id=2221>  
The starry sky <http://www.astronomy.com/asy/default.aspx?c=a&id=2297>  
The deep sky <http://www.astronomy.com/asy/default.aspx?c=a&id=2229>  
Light pollution <http://www.astronomy.com/asy/default.aspx?c=a&id=2249>  
The Sun <http://www.astronomy.com/asy/default.aspx?c=a&id=2222>  
Moon and planets <http://www.astronomy.com/asy/default.aspx?c=a&id=2220>  
The aurora <http://www.astronomy.com/asy/default.aspx?c=a&id=2088>  
Meteors <http://www.astronomy.com/asy/default.aspx?c=a&id=2109>  
Comets <http://www.astronomy.com/asy/default.aspx?c=a&id=2295>

### Astronomy books for beginners (see <http://www.skymaps.com/store/cat02.html>)

*Nightwatch, A Practical Guide to Viewing the Universe*, by Terence Dickinson  
*The Backyard Astronomer's Guide*, revised edition, Terence Dickinson & Alan Dyer  
*Turn Left at Orion*, by Guy Consolmagno & Dan M. Davis,  
*Touring the Universe*, a Sky Guide book, by Ken Graun  
*The Stars, A New Way to See Them*, by H. A. Rey (classic for learning constellations)

### Books on buying & using telescopes (see <http://www.skymaps.com/store/cat05.html>)

*Star Ware*, by Philip Harrington  
*Astronomy Hacks*, by Robert and Barbara Thompson  
*How to Use an Astronomical Telescope*, by James Muirden  
*How to use a Computerized Telescope*, by Michael Covington

### Star charts, atlases & guides (see <http://www.skymaps.com/store/cat01.html>)

*Bright Star Atlas 2000.0* by Wil Tirion  
*Sky & Telescope's Pocket Sky Atlas*, by Roger Sinnott  
*Sky Atlas 2000.0*, 2<sup>nd</sup> Edition, by Wil Tirion & Brian Skiff  
*Norton's Star Atlas & Reference Handbook*, outdated classic, first published in 1910  
*The Cambridge Star Atlas*, by Wil Tirion  
*Uranometria 2000.0* (2 volumes), by Tirion, Rappaport & Remaklus  
*The Night Sky Observer's Guide* (3 volumes), by George Kepple & Glen Sanner  
*Sky & Telescope's Field Map of the Moon*, by Antonin Rukl

### Sources of books on astronomy and observing

Willmann-Bell <http://willbell.com>  
Sky and Telescope <http://www.shopatsky.com/products/U802/Great%20Books.htm>  
SkyMaps.com <http://www.skymaps.com/index.html>  
Anacortes Telescope & Wild Bird <http://www.buytelescopes.com/store.asp?s=7>  
Cambridge University Press <http://www.cambridge.org/us/astronomy/>  
Firefly Books <http://www.fireflybooks.com/Astronomy>  
Springer <http://www.springer.com/astronomy?SGWID=0-123-0-0-0>

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### Tutorials on buying telescopes and accessories

*Sky and Telescope* magazine series of articles on “Choosing Your Equipment”

<http://www.skyandtelescope.com/equipment/basics/>

“Choosing Your First Telescope”

<http://www.skyandtelescope.com/equipment/basics/12511616.html>

“How to Choose a Telescope”

<http://www.skyandtelescope.com/equipment/basics/3303926.html>

“A Guide to Eyepieces”

[http://www.skyandtelescope.com/equipment/basics/Guide\\_to\\_Eyepieces.html](http://www.skyandtelescope.com/equipment/basics/Guide_to_Eyepieces.html)

“An Eyepiece Primer”

<http://www.skyandtelescope.com/equipment/basics/3311076.html>

“Choosing Your Telescope’s Magnification”

<http://www.skyandtelescope.com/equipment/basics/3077091.html>

“Take-Along Telescopes”

<http://www.skyandtelescope.com/equipment/basics/3309021.html>

“The Art of Using a Telescope”

[http://www.skyandtelescope.com/equipment/basics/The\\_Art\\_of\\_Using\\_a\\_Telescope.html](http://www.skyandtelescope.com/equipment/basics/The_Art_of_Using_a_Telescope.html)

*Astronomy* magazine series of articles on astronomy, titled “Equipment”

<http://www.astronomy.com/asy/default.aspx?c=ss&id=156>

“Using binoculars”

<http://www.astronomy.com/asy/default.aspx?c=a&id=2225>

“Buying a telescope”

<http://www.astronomy.com/asy/default.aspx?c=a&id=2281>

“Using a telescope”

<http://www.astronomy.com/asy/default.aspx?c=a&id=2282>

“Large telescopes” (subscribers only)

<http://www.astronomy.com/asy/default.aspx?c=a&id=2284>

“Accessories”

<http://www.astronomy.com/asy/default.aspx?c=a&id=2072>

“Photography”

<http://www.astronomy.com/asy/default.aspx?c=a&id=2073>

“Software overview” (subscribers only)

<http://www.astronomy.com/asy/default.aspx?c=a&id=2290>

“Shopper’s guide:

<http://www.astronomy.com/asy/default.aspx?c=a&id=3650>

“Choosing a Telescope: Advice for Anyone Seeking to Buy

A Telescope”, Company Seven – <http://www.company7.com/library/begin.html>

“So You Wanna Buy a Telescope,” by Ed Ting <http://www.scopereviews.com/begin.html>

The Heretic’s Guide to Choosing & Buying Your First Telescope <http://findascope.com/>

Telescope Buyers’ FAQs <http://www.astronomytoday.com/astronomy/tbfaq.html>

“Recommendations for Beginning Astronomers” <http://www.weatherman.com/BEGINNER.HTM>

How to choose the right Telescope <http://www.opticsplanet.net/how-to-buy-a-telescope.html>

Telescope Buying Guides, NOVAC, <http://www.novac.com/resources/advice/>

How to buy a telescope

[http://www.space.com/scienceastronomy/astronomy/telescopes\\_page\\_000707.html](http://www.space.com/scienceastronomy/astronomy/telescopes_page_000707.html)

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### Reviews and aids to choosing a telescope and accessories

Orion Advisor [http://www.telescope.com/control/decisionwizard/~page\\_id=telescope](http://www.telescope.com/control/decisionwizard/~page_id=telescope)  
Excelsis Astronomy Reviews <http://www.excelsis.com/1.0/catalog.php?categoryid=6>  
Space and Astronomy News <http://www.telescopes.org/>  
Cloudy Nights <http://cloudynights.com/>  
Telescope Review Web Site by Ed Ting <http://www.scopereviews.com/>  
Weatherman Astronomy by Todd Gross <http://www.weatherman.com/>  
Affordable Astronomy Equipment Reviews <http://members.tripod.com/irwincur/>

### Examples of manufacturers of entry-level telescopes

Orion <http://www.telescope.com/control/main/> (also a retailer)  
Celestron <http://www.celestron.com/c2/index.php>  
Meade <http://www.meade.com/>  
Vixen Optics <http://vixenoptics.com/>  
Stellarvue <http://stellarvue.com/index.html>  
Antares <http://www.antareshoptical.com/>  
Bushnell <http://www.bushnell.com/general/telescopes.cfm?section=Astronomy>

### Examples of manufacturers of high end telescopes

Meade, Celestron, Vixen, Orion, Antares, Stellarvue (see links above)  
Astro-Physics <http://www.astro-physics.com/>  
TeleVue Optics <http://www.televue.com>  
Takahashi <http://www.takahashiamerica.com>  
TMB Optical <http://www.tmboptical.com/>  
William Optics <http://www.williamoptics.com/>  
Astronomy Technologies <http://www.astronomytechnologies.com/>  
Starmaster Portable Telescopes <http://starmastertelescopes.com/>  
Obsession Telescopes <http://www.obsessiontelescopes.com/telescopes/index.html>  
JMI Telescopes <http://www.jimsmobile.com/index.htm>  
Coronado (solar telescopes) <http://coronadofilters.com/>

### Examples of retailers of telescopes and astronomy equipment

*Astronomy* Shopper's Guide <http://www.astronomy.com/asy/default.aspx?c=a&id=3650>  
Orion Telescopes and Binoculars <http://www.telescope.com/control/main/>  
Astronomics <http://www.astronomics.com/>  
Anacortes Telescope & Wild Bird <http://www.buytelescopes.com/>  
Oceanside Photo & Telescope <http://www.optcorp.com/>  
Kendrick Astro Instruments <http://www.kendrickastro.com/astro/index.html>  
Hands on Optics <http://www.handsonoptics.com/>  
High Point Scientific <https://www.highpointscientific.com/store/dynamicIndex.asp>  
Scope City <http://www.scopecity.com/>  
Skies Unlimited <http://www.skiesunlimited.net/>  
Telescopes.com <http://www.telescopes.com/>  
Lumicon <http://lumicon.com/>

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### Examples of possible first telescopes

Each merchant in the retailer section on the previous page and in the “Shopper’s Guide” section of Astronomy magazine’s web site has a wide selection of telescope products (<http://www.astronomy.com/asy/default.aspx?c=a&id=3650>). Read the specs of a few scopes in your price range and compare features to get a better idea of what best meets your needs. Then, before you purchase a telescope, come to a star party and take a look through a few scopes and ask experienced amateur astronomers for their thoughts. Except for the Edmund AstroScan and the Meades, the telescope examples listed below appear in Orion Telescope’s catalog, and they are presented only as illustrative examples, providing a range of capabilities and prices for comparison. *This list is by no means a recommendation or endorsement, either of Orion or of the specific telescopes shown.*

#### Dobsonian-mounted Newtonian reflectors

Edmund AstroScan	\$199.00 (best for young children only)
StarBlast	\$249.95
SkyQuest XT6	\$229.95
SkyQuest XT8	\$299.95
SkyQuest XT10	\$479.95
SkyQuest XT6 IntelliScope	\$379.95
SkyQuest XT8 IntelliScope	\$499.95
SkyQuest XT10 IntelliScope	\$669.95
Meade Lightbridge 12” Truss	\$899.00

#### Newtonian reflectors

StarBlast 4.5 EQ Reflector	\$199.95
SpaceProbe 130ST EQ Reflector	\$279.95
Celestron StarSeeker 130mm GoTo Reflector	\$399.95
VersaGo 130ST AltAz Reflector	\$429.9
SkyView Pro 8 EQ Reflector	\$629.95
SkyView Pro 8 GoTo Reflector	\$1079.95

#### Cassegrain telescopes

Celestron NexStar 5SE Go To Schmidt Cassegrain	\$799.00
SkyView Pro 150 (6”) Go To Maksutov Cassegrain	\$1399.95
Meade ETX-125PE 5” Maksutov	\$899.00
Celestron NexStar 8SE Go To Schmidt Cassegrain	\$1399.00

#### Refractor telescopes

Short Tube 80 EQ Refractor	\$299.95
AstroView 100mm EQ Refractor	\$419.95
Celestron StarSeeker 100mm GoTo Refractor	\$429.95
AstroView 120ST EQ Refractor	\$519.95
Celestron C6 R-GT Computerized 150mm Refractor	\$1099.00

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### Necessary gear and useful accessories

- Astronomical telescope
- Tripod & Mount – often sold with scope
- Tracking and "Go To" Mount – automatically finds and tracks objects
- Eyepieces
- Accessory case
- Finder scope or unit power laser finder
- Star diagonal
- Battery or power supply (for powered mounts and accessories)
- Dew removal system – for refractors and Cassegrains
- Collimation tools (for Newtonian reflectors)
- Red flashlight
- Small folding table
- Adjustable chair or step-stool
- Star charts and observing guides
- Planetarium computer programs

### Astronomy organizations and links

- The Astronomical League <http://www.astroleague.org/>
- Sky & Telescope links page <http://www.skyandtelescope.com/resources/internet/3304931.html>
- The Astronomical League <http://www.astroleague.org/>
- Virginia Association of Astronomical Societies <http://www.richastro.org/vaas.htm>
- Northern Virginia Astronomy Club (NOVAC) <http://novac.com/>
- Richmond Astronomical Society <http://www.richastro.org/>
- International Dark-Sky Association <http://www.darksky.org/mc/page.do>
- NASA Science Missions <http://nasascience.nasa.gov/>
- NASA JPL Missions <http://www.jpl.nasa.gov/missions/>
- Spaceweather Earth-Sun Environment <http://spaceweather.com/>
- Astromart Used Equipment Classifieds <http://www.astromart.com/>