# FAQs

## Package Choices

**Q: What Package should I select for my telescope?**
**A:** If you own only one telescope such as an SCT, Newtonian, or Refractor, select the specialized Standard or Denk II Package for that telescope. Ex: Refractor Owners should select the Standard ($695) or Denk II ($1295) Refractor Power x Switch Package. Make sure to specify star diagonal being used when ordering through your dealer or directly from Denkmeier Optical.
**Q: Power x Switch Diagonal, or Power x Switch Package?**
**A:** If you own a Refractor or SCT, be sure to read more about our new Power x Switch Star diagonals. These diagonals offer an option where the Power x Switch System is integrated into our diagonals. Newtonians cannot use star diagonals so this is not a Newtonian option. See the "Power x Switch Star Diagonals" section on our website. The information provided will help you to decide if this is a preferable option.
**Q: What if I own more than one telescope?**
**A:** If you own a **Refractor** and **SCT**, order the Refractor Power x Switch Package as it will operate with either telescope optimally. The Standard Refractor Power x Switch package includes an adapter to allow a 2" star diagonal with filter threads to be used or any 1.25" diagonal with filter threads. The Standard Package allows SCT focal reduction of F/6.6, F/11.5 and then a thread-on cell allows F/20. In a Refractor, 1.3X and 2.5X are obtained in a 1.25" diagonal and slightly higher factors occur with 2" diagonal use.
**Q: What if I own a Newtonian as well as an SCT or Refractor?**
**A:** If you own a Newtonian and Refractor or Newtonian and SCT, then the Universal Power x Switch Package may be ordered. This will allow a Newtonian to operate at low and higher powers and will allow a Refractor or SCT to be used as well. It will alleviate the need for the purchase of additional specialized parts from Denkmeier. There are differences between the performance in an SCT and Refractor with the Universal Power x Switch Package as compared to the specialized packages. We will outline these differences in this FAQ list. It should be noted that selection of the appropriate eyepieces could allow top performance in SCTs and Refractors when using the Universal Packages. We will address this in the FAQs as well.

## Standard Binoviewer Packages

**Q: What benefits would the more scope-specialized Standard Power x Switch Package have over a Universal Power x Switch Package if any?**
**A:** The **Standard Universal Power x Switch Package** actually performs identically to the Standard SCT and Refractor Power x Switch Packages when used in both an SCT and Refractor. The single arm Universal Power x Switch is the same as that included in those specialized packages. When used in a Newtonian, the lower end magnification of 1.2X produced in the specialized Standard Newtonian Power x Switch Package increases to 1.3X when using the Universal version. So, there are very minimal differences between the Universal and specialized Standard Power x Switch Packages.

## Denk II Packages

**Q: What benefits would the use of the more specialized Denk II Power x Switch Packages for their respective telescope designs have over use of the DII Universal Power x Switch Package?**

**A:** The specialized packages create different magnification factors. The Non-Universal Refractor Power x Switch Packages allow magnifications of 1.4X, 2.25X and 3.5X while the Non-Universal SCT Power x Switch Package allows F/6.6,F/11.5,F/20, and F/30 (using a thread-on 3X Multiplier). Because the Universal Power x Switch has been designed to function on a Newtonian as well, it allows lower magnification factors that are well suited for large dobsonians. 1.2X, 1.8X and 2.3X are those factors. This means that refractor use and SCT produce lower magnifications as well. 1.3X, 1.8X and 2.25X are the factors in Refractors and a foal reduction factor of .6X, .8X and then magnification of 1.15X are produced in an SCT.

**Q: Aside from the differences in magnification in Refractors and SCTS, are there other differences that result when using a Universal package vs. a specialized Denk II Refractor or SCT Power x Switch Package?**

**A:** The main differences involve better illumination performance obtained with certain eyepiece designs when using the specialized packages. The greater focal reduction obtained with the DII Universal Power x Switch in the lowest power mode when used in an F/10 SCT means that certain wide field eyepieces will suffer from a fall off of illumination. This illumination fall off will be less obvious with use of the specialized DII SCT Power Switch Package. The same fall off issues will occur in a refractor. However, most eyepieces will work excellently with either package if recommended eyepiece selection is followed. Please see the FAQ eyepiece recommendations as a guideline for eyepiece selection. Selecting the proper eyepieces will have an important effect on performance of our systems. We have designed our D21s for outstanding performance with both the Universal and Specialized Power x Switch Packages.

**Q: How is Newtonian operation different when using the Specialized DII Newtonian Package vs. The DII Universal Power x Switch Package?**

**A:** The special 1.2X  Multi-Purpose OCS Cell is supplied with the DII Universal Power X Switch Package. This indicates that the low power mode of the Power x Switch begins at 1.2X times that of the same eyepiece used without the binoviewer in the same telescope. This magnification factor occurs when the 1.2X Cell works when the Universal Power x Switch is set in the low power position.

**Q: Should I choose the 1.4X or the 1.2X Cell for my Newtonian?**

**A:** The Multi-Purpose OCS Cell included with the more specialized Denk II Newtonian Power x Switch Package creates a low power of 1.4X.  While this entry magnification factor is higher than 1.2X cell included with the Denk II Universal Package, the 1.4X Cell requires **less in-travel**. In low power 1.4X mode, it will intrude into the light path of a Newtonian telescope to a lesser degree if at all, as compared to the 1.2X Universal Multi-Purpose OCS Cell. The Universal 1.2X Cell requires approximately one additional inch of intrusion and therefore, the Newtonian Spacer Tube Assembly of the Universal Package includes an additional section to create this extra length of the spacer tube. If your Newtonian telescope is of a design that requires eyepieces to be racked in a long way and is configured to be visually optimized, the 1.4X cell may be a better choice. If the 1.2X cell is used on a Newtonian where focus is well inward, the low power mode of

the Power x Switch will produce a substantial amount of Spacer Tube intrusion inside of the telescope optical path.

**Q: Is there a way to use the 1.2X Cell without such intrusion into the light path of my Newtonian?**

**A:** Such intrusion occurs because the spacing between the primary mirror and secondary mirror has been increased. This is sometimes done because it allows a secondary mirror to be made as small as possible, thus minimizing the size of the secondary obstruction. In other cases, the increased spacing distance between the primary and secondary is unnecessary. We have tested our systems in many commercial telescopes. Starmaster®, Nightsky®, Meade®, Orion® and many other off-the-shelf Newtonians allow minimal intrusion when using the 1.2X Cell. Some other telescopes are not as focus-friendly and require a great deal of lengthening of the Newtonian Spacer Tube Assembly of both the specialized Newtonian Power x Switch Package and even more lengthening with the Universal Power x Switch Package. It should be mentioned that the mid-range and higher magnification factors of the Universal Power x Switch do not require this intrusion into the light path in most circumstances. If strut poles are shortened to some degree in scopes where the focal plane difficult to access, the Newtonian Spacer Tube Assembly can be racked outward by that same amount. If lowest 1.2X magnification is desired in a telescope where the focal plane is rather far inward, intrusion will occur unless the telescope is adjusted. Moving up mirror collimation bolts, mirror cells, or shortening truss tubes a bit is a good solution.

**Q: What implication does intrusion of the Spacer Tube Assembly have for images?**

**A:** In our opinion, intrusion into the light path has little if any visual consequences. Intrusion occurs in the low power mode so the diffraction created by the obstruction of the Newtonian Spacer Tube assembly has no noticeable effect. In higher power modes where planet and Lunar high resolution viewing is undertaken, the spacer tube assembly should withdraw from the light path as focus is obtained since the mid and high power modes require the focuser to be racked outward. A 1.4X cell is available ($149) and a 3.2X cell is also available ($149). Use of these cells makes intrusion absolutely unnecessary in mid and higher power modes and the 1.4X cell creates a non-intrusive situation when using the low power 1.4X mode in the majority of Newtonian telescopes available today. A Newtonian is an obstructed optical system and the desire to downsize this obstruction as much as possible can create difficulties for our lowest power systems. Yet, almost any Newtonian will operate at our lowest power 1.2X Universal mode for wide field deep sky observations, though intrusion into the light path will occur to a greater degree with heavily visually optimized Newtonians.

**Q: Will the specialized Denk II Newtonian Package (non-Universal) be usable with a Refractor and SCT?**

**A:** The specialized DII Newtonian Power x Switch Package with the 1.4X optic will operate on a refractor however, this optic would be less suited as compared with the 1.2X cell because reaching focus would require the racking out of the refractor focuser and higher magnification would result at the low power end when the 1.4X cell was threaded into the 2” star diagonal filter threads. It should be mentioned that either the 1.2X or 1.4X cell must be used in the star diagonal of a refractor on the telescope side filter threads in order for focus to occur. The non-Universal Newtonian Package may also be used on an SCT in the same way that the Universal can be used. The primary difference between the

non-Universal DII Newtonian Power x Switch Package and the Universal Power x Switch Packages is that the Universal includes the extra length of the Newtonian Spacer Tube Assembly and automatically includes the 1.2X Multi-Purpose OCS Cell. The 1.2X Cell can be substituted with the 1.4X cell if this is desired at no additional charge.

# Eyepieces

**Q: What eyepieces should I use with my Denk Binoviewer System?**
**A:** It depends on what telescope and Denk system is being used. We will offer some guidelines that will allow optimal performance to be achieved.

## SCTs

Because both The Standard and DII systems allow for focal reduction, it is important to select the proper eyepiece focal length and design to allow for maximum illumination of the eyepiece field stops. It is also advisable to collimate with the binoviewer in place and the Power x Switch in focal reduction mode for best correction. In focal reduction mode with either the Universal or non-Universal Power x Switch Packages, wide field eyepieces with apparent fields of 60-82 degrees should not exceed 21mm in focal length (ex: 25mm is too long) if edge darkening is not to occur. Also remember that high power modes are possible with the SCT Packages including a 3X thread-on cell included with the Denk II SCT Power x Switch Package. Here are some recommended eyepieces for each system:
**Denk Standard SCT Power x Switch Package:** 32mm-15mm Plossl, 25mm-12.5mm orthoscopics, 21mm-13mm widefields.
**Denk II SCT Power x Switch Package:** 32mm –25mm Plossl, 25-18mm Orthoscopics,21mm-13mm widefields.
**Denk II Universal Power x Switch Package:** 25mm Plossls, 25-10mm Orthoscopics, 21mm –13mm wide Fields.

Note: The Denkmeier, D21 wide field eyepieces have been carefully designed to operate in any SCT or Universal Package. The 21s operate as if they were 32mm, 65 degree eyepieces in an F/10 SCT when the SCT Power Switch Package of the Standard Universal Power x Switch Package is used and they behave as if they were 35mm, 65 degree eyepiece when the DII Universal Power x Switch Package is used.

## Refractors

Most eyepieces work very well in any of the packages when used in a refractor. There are a few exceptions and these eyepiece designs require special attention if being used.
**Standard Refractor Power x Switch Package:** Virtually any 1.25” Plossl of 40mm or shorter. Due to the high power mode feature, a focal length of shorter than 10mm is not recommended. Widefield designs are excellent as well but review the information below before selecting specific widefield designs.
**Denk II Refractor Power x Switch Package:** The high power 3.5X Power x Switch mode of this package places a limit on eyepiece focal length that we recommend. Eyepieces should not have a focal length shorter than 12mm though this is a guideline and depends on Refractor aperture and highest useful magnification. An 8mm eyepiece pair for example would behave like a 2mm pair with the 3.5X Power x Switch Arm set to

“IN”. Any Orthoscopic can be used as long as the useful magnification of the telescope is not exceeded. Widefield designs of 21mm and shorter will produce outstanding views. Our D21s are highly recommended.

Note: The very popular and excellent 24mm Panoptic® 68 degree wide fields being used regularly in many brands of binoviewers have a very large field stop as do the 30mm Ultima® 50 degree eyepieces that are also very popular. These eyepieces have 27mm+ field stops. Use of these in Standard, Universal and even DII Refractor Power x Switch Packages will produce some edge darkening. There are special cells available that allow excellent illumination when threaded to the Denk Nosepieces. The #250 1.25”($119) or 2” Refractor OCS Cell ($149) allow full illumination in virtually any 1.25” eyepiece pair. The Power x Switch arm (s) must be set to the “OUT” position. These eyepieces can produce outstanding and comfortable views when used in a refractor in combination with our system. This is why we designed special optical accessories to make this possible.

### Newtonian Telescopes

Newtonian Telescopes can use a large range of eyepiece designs and focal lengths. The OCS™ and Power x Switch systems are very effective at correcting coma and the field in general. Useful magnification limits with single eyepiece use may be applied to each Denkmeier Binoviewer System as well. Multiply the magnification produced when using your eyepieces as singles by:
Denk II Universal Power x Switch Package: 1.2X, 1.8X and 2.3X
Denk II Newtonian Power x Switch Package: 1.4X, 2X and 2.5X for.
Standard Universal Power x Switch package: 1.4X, and 2.5X
All Plossls are fine to use if not exceeding the maximum usable magnification of your telescope.30mm plossl like the Ultimas by Celestron work very well and we recommend them as a low power pair. 24 Panoptics  are widely acclaimed as are 19mm Panoptics, 16mm Naglers and 13mm Naglers. Orthoscopics are highly recommended for high-resolution planet and Lunar viewing but again, be sure to factor in the magnification modes of the Power x Switch for your respective package before making a purchase. Ex: A 10mm Orthoscopic pair will work like 10mm/2.3X =4.3mm when using the high power mode of the DII Universal Power x Switch. This is very high for most observations though splitting doubles certainly may call for this kind of magnification.

## Denkmeier Eyepieces

As previously mentioned, our D21 eyepieces have been carefully designed to operate with all of our systems. At the time of writing, D14s are being produced and hopefully will be available soon. Please see our website and our eyepiece information page at http://deepskybinoviewer.com/Eyepieces.html for additional information.