DIGISCOPING

An overview of the common camera adaptations and necessary adapters for afocal photography and eyepiece projection with spotting scopes and telescopes

EXAMPLE

AFOCAL PHOTOGRAPHY

EXAMPLE

EYEPIECE PROJECTION

Adaptation of Cameras (Compakt & System/DSLR) with Front-Filter-Thread using either M43- or SP54-Thread

Compact cameras and system cameras which provide a front-filter thread can be attached firmly and without risk of tilting to eyepieces with M43- or SP54-threads. Cameras with M43-thread can also be attached directly; the M43-extension rings prevents the lenses from colliding.

This kind of photography works better with tele- than wide-angle-lenses. It works better if the camera lens is smaller than the lens of the eyepiece. Wide-angle-eyepieces like Morpheus® or Hyperion® are perfect for afocal projection photography.

$$\text{Equivalent focal length} = \frac{\text{Magnification of the eyepiece}}{\text{Focal length of camera lens}}$$

Adaptation of a DSLR to a Morpheus®-eyepiece

Adaptation of a compact camera with M43-thread to a Morpheus®-eyepiece

M82

Stepper-Ring M72/M82
 # 2958082

M67 **M72** **M77**

Stepper-Ring M62/M67
 # 2958067

Stepper-Ring M62/M72
 # 2958072

Stepper-Ring M62/M77
 # 2958077

M28 **M37** **M46** **M49** **M52** **M55** **M58** **M62**

SP54/M28 DT-Ring
 # 2958028
(requires *# 2958090*)

SP54/M37 DT-Ring
 # 2958037
(requires *# 2958090*)

DT-Ring SP54/M46
 # 2958046

DT-Ring SP54/M49
 # 2958049

DT-Ring SP54/M52
 # 2958052

DT-Ring SP54/M55
 # 2958055

DT-Ring SP54/M58
 # 2958058

DT-Ring SP54/M62
 # 2958062

SP 54i/SP 54a Hyperion® Extension Ring, 11mm, with threaded protective flap for the SP54 external thread
 # 2958090

One adjustment spacer ring made of hard plastic for the SP 54 thread is part of each Hyperion DT-ring free of charge. With these spacer rings (each ring has a thickness of only 1 mm), differences in mechanical heights may be adjusted, to be able to adapt the camera front lens as close as possible, without having to use the 11 mm extension ring (*# 2958090*).

Caution when mounting the camera! Camera-front lenses may be too close to the first lens of the eyepiece only by a tenth of a millimeter. When mounting an eyepiece onto any camera-front-lens, always proceed with the greatest care, possibly using the additional spacer ring. Also make sure that there is not too much weight on the camera lens, to prevent the autofocus-mechanic from damage.

M43

Hyperion® / Morpheus® M43 Extension *# 2954250* to adapt lenses with M43-thread – protects the lenses from touching each other

Hyperion® Zoom M43/ SP54 Adapter
 # 2958086

Morpheus® M43/SP54-Adapter
 # 2954251

M43

Hyperion® / Morpheus® M43 Extension *# 2954250* to adapt lenses with M43-thread – protects the lenses from touching each other

SP54 / M43

Hyperion® 68° / Hyperion® Aspheric eyepiece with fixed focal length, with M43 and SP54-threads

M43

Hyperion® Universal Zoom Mark IV, 8-24mm Eyepiece
 # 2454826

M43

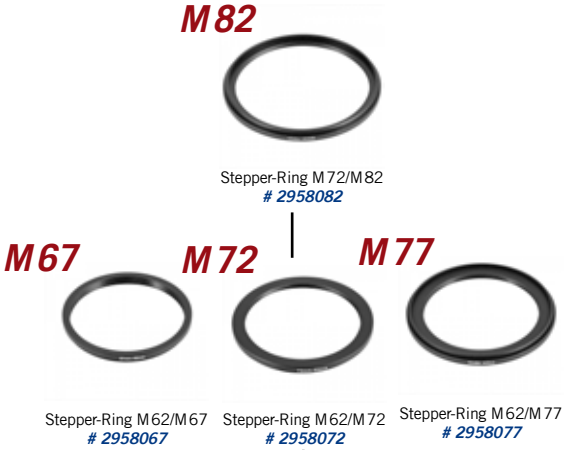
Morpheus® Eyepiece with M43-thread

Adaptation of Cameras (Compakt & System/DSLR) with Front-Filter-Thread using the T-2-Thread

The eyepieces of many spotting scopes are equipped with a T-thread instead of the larger M43-thread. Use the DT-Adapter II to connect the SP54-Rings even with these eyepieces, as described on the previous page.

This kind of photography works better with tele- than wide-angle-lenses. It works better if the camera lens is smaller than the lens of the eyepiece.

$$\text{Equivalent focal length} = \frac{\text{Magnification of the spotting scope}}{\text{Focal length of camera lens}}$$



Stepper-Ring M72/M82 **# 2958082**

Stepper-Ring M62/M67 **# 2958067**

Stepper-Ring M62/M72 **# 2958072**

Stepper-Ring M62/M77 **# 2958077**

SP54/M28 DT-Ring **# 2958028** (**# 2958090** erforderlich)

SP54/M37 DT-Ring **# 2958037** (**# 2958090** erforderlich)

DT-Ring SP54/M46 **# 2958046**

DT-Ring SP54/M49 **# 2958049**

DT-Ring SP54/M52 **# 2958052**

DT-Ring SP54/M55 **# 2958055**

DT-Ring SP54/M58 **# 2958058**

DT-Ring SP54/M62 **# 2958062**

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DT-Adapter II
T-2 / SP54a expanding adapter T-2
 # 2458040

T-thread

Tip: If an eyepiece has both M43- and SP54-threads, you should better use an SP54-adapter, as described on the previous page.

Hyperion® / Morpheus® T-adapter M43/T-2 **# 2958080**

Eyepiece with T-thread, e.g. included with many Celestron spotting scopes

Morpheus®/Hyperion® eyepiece with M43-thread

Adaptation of Smartphones and Compact Cameras without Front-Filter-Thread

Compact cameras without a lens thread and even smartphones can also be used to take photographs through the eyepiece of spotting scopes, binoculars and microscopes. To position the lens precisely above the eyepiece, an adjustable adapter comes very handy – otherwise an oblique view quickly leads to image errors. The magnification is calculated as follows:

$$\text{Equivalent focal length} = \frac{\text{Magnification of the spotting scope}}{\text{Focal length of camera lens}}$$

MICROSTAGE II
Digiscoping Adapter

MicroStage II
 # 2450330

The Microstage II is a very reasonably prized camera mount for all eyepieces with diameters between 29 and 63mm. The arm (camera mount) of the Microstage II can be moved in several axles, so that you can align the optical axis of a camera centered behind the eyepiece. Folded together, it is very compact at 18,5x12x2,6cm and a weight of only 220g.
The digiscoping adapter locks into different positions so that the camera position is reproducible – even if you move the camera to the side to take a look through the eyepiece.
The clamp and the arm which holds the camera is covered with a rubber coating that guarantees a secure hold and protects the camera and eyepiece from scratches.

NexYZ

NexYZ fits any eyepiece from 35mm to 60mm in diameter, including telescopes equipped with 1.25" or 2" eyepieces, spotting scopes, monoculars, and binoculars. NexYZ accommodates a wide range of smartphones including the larger "phablets". The phone platform is fully adjustable and can fit any device—usually with the case still on.
The secure platform stands up even to the weight of heavier devices with ease, thanks to NexYZ's strong metal spring and threaded twist lock.
Switching phones, eyepieces, or optical instruments, requires only slight adjustments to re-center the camera over the new eyepiece. If multiple people want to capture a shot through your optic, NexYZ's simple spring-loaded clamps make it easy to remove one device and replace it with another in seconds. NexYZ is the ideal solution for star parties and group bird walks where everyone wants their own shot of the action.
You can also switch your image from portrait to landscape simply by turning the padded eyepiece clamp and readjusting the X-, Y-, and Z-axis to realign your phone with the eyepiece.

NexYZ Universal 3-Axis
Smartphone Adapter
 # 825821

EYEPIECE PROJECTION

www.baader-planetarium.com

Adaptation of Camera Bodies (System-/DSLR-Cameras) with T-Adapter using either T- or M43-Thread

Camera bodies can be attached directly to eyepieces which are equipped with a T-thread. But to get an image which is sharp even in the corners, the front of the T-ring should be placed in a distance of 40 mm (full-frame camera), 30mm (APS-C) or 15mm (Micro 4/3) to the eyepiece. The equivalent focal length compared to 35mm is calculated as follows:

$$f_{equivalent} = f_{spotting\ scope} \times ((a/f_{eyepiece})-1)$$

$f_{spotting\ scope}$ = *Focal length of spotting scope.* **a** = *Distance between sensor and eyepiece* ***incl. 55 mm T-2-flange-back****. E.g. a 40mm extension gives a distance of 95mm.* $f_{eyepiece}$ = *Focal length of eyepiece.*

Available T-Rings:

#2408319 *Canon EOS* | ***#2408302*** *Pentax-K* | ***#2408330*** *Micro Four Thirds* | ***#2408329*** *Four Thirds* | ***#2408331*** *Fujifilm X* | ***#2408300*** *Nikon* | ***#2408317*** *Sony E/NEX* | ***#2408301*** *M42 x 1 (Praktika/Pentax-S)* | ***#2958550*** *Protective CANON DSLR-T-Ring T-2/M48 and 2"* *(with / without filter)*

Available T-2-extensions

T-2 extension 40mm (T-2 part #25B) ***#1508153***
T-2 extension 15mm (T-2 part #25A) ***#1508154***
T-2 extension 7,5mm (T-2 part #25C) ***#1508155***
VariLock 29 – variable, 20-29mm ***#2956929***
VariLock 46 – variable, 29-46mm ***#2956946***

Full format

Camera-dependent T-Ring 55 mm flange-back

APS-C

Camera-dependent T-Ring 55 mm flange-back

Micro 4/3

#2408330 MFT-Adapter 55 mm flange-back

Extension: 40 mm

#1508153 40mm extension

Extension: 45 mm

#1508154 15mm extension
#1508154 15mm extension
#2456322 Quick Changer

Extension: 30 mm

#1508154 15mm extension
#1508154 15mm extension

Extension: 30 mm

#1508154 15mm extension
#2456322 Quick Changer

Extension: 15 mm

#1508154 15mm extension

Extension: 15 mm

#2456322 Quick Changer

Hyperion® / Morpheus® T-Adapter M43/T-2 ***# 2958080***

Eyepiece with T-thread, e.g. included with many Celestron spotting scopes

Morpheus®/Hyperion® Wide-angle eyepiece with M43-thread

T-2 Quick Changers

The T-2-Quick Changing System with an optical height of 15mm concists of a dovetail with male T-2-thread and quick changer ring. The ***TQC / TCR Heavy duty T-2 Quick Changing System #2456322*** *has got a Zeiss-compatibe lock even for very heavy accessories, while the cheaper* ***T-2 Standard Changer System #2456321*** *uses a M4-locking screw with a rounded tip.*

Standard T-2-Quick-Changer

TCR T-2 Hardened Steel Change Ring with Zeiss micro bayonet

TQC Heavy Duty T-2 Quick-Changer

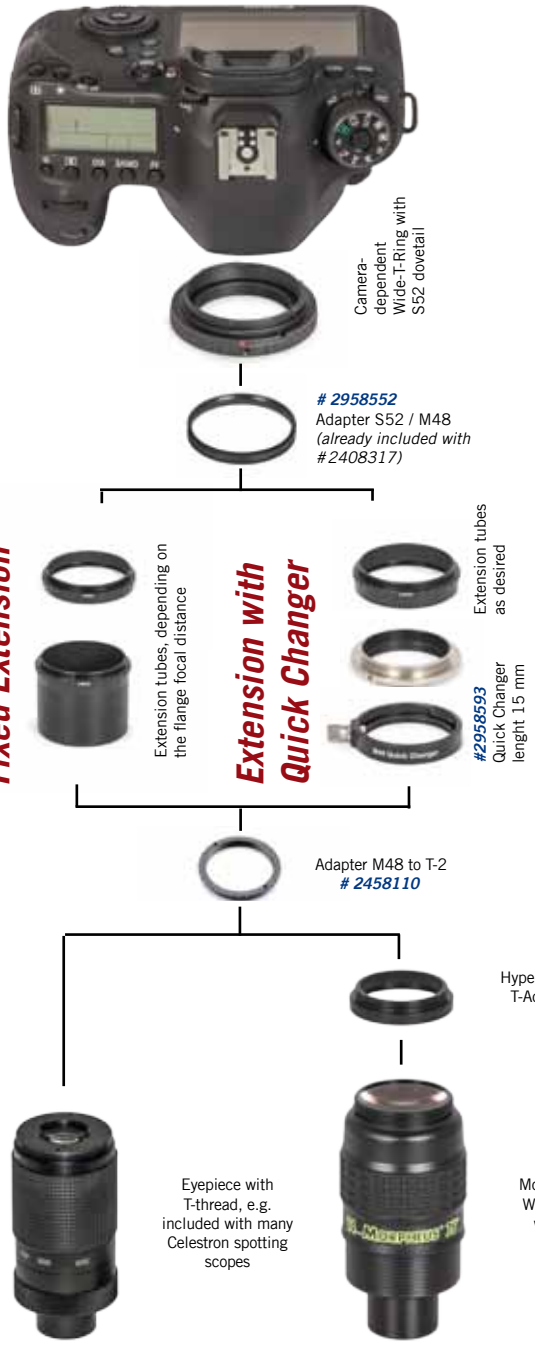
Adaptation of Camera Bodies with M48-Adapter using either T- or M43-Thread

The M48 system is common in astronomy and uses the entire aperture of the widely used 2" focusers. This means that the free aperture is even larger than the sensor of a full-frame camera, and vignetting is avoided. Cameras with the smaller APS-C or MFT format are also fully illuminated with a T-2 adapter.
The adapters can of course also be used for eyepiece projection. Since they were developed for telescopes, they do not take the T-2 flange distance format into account – this is especially true for the slim mirrorless cameras. The magnification factor is calculated exactly as described in the T-2 system. The distance results from the camera-specific flange focal length and the extension rings used; for full-frame sensors it should not be less than 95 mm and for APS-C 85 mm in order to avoid image errors.

Available Wide-T-Rings:

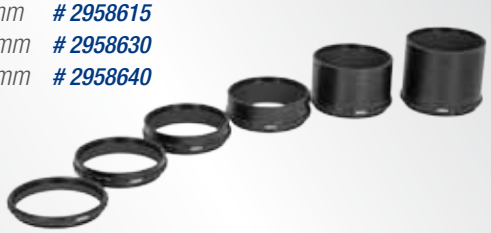
DSLR Cameras:
***#2408332** Canon EOS | **#2408334** Sony Alpha/Minolta Maxxum | **#2408333** Nikon |*
***#2958550** Protective CANON DSLR-T-Ring T-2/M48 and 2" (with / without Filter)*
Mirrorless Cameras:
***#2408336** Canon R | **#2408331** Fujifilm X | **#2408335** Nikon Z | **#2408317** Sony E/NEX (M48 und T-2)*

DSLR/Mirrorless Camera



Available M48-Extensions

Heavy Duty M48 Quick Changing System, 15mm length	***# 2958593***
M48 Extension Tube 5 mm	***# 2958605***
M48 Extension Tube 7,5 mm	***# 2958607***
M48 Extension Tube 10 mm	***# 2958610***
M48 Extension Tube 15mm	***# 2958615***
M48 Extension Tube 30 mm	***# 2958630***
M48 Extension Tube 40 mm	***# 2958640***



Flange focal distance for several camera systems with Wide-T-Rings

Canon EOS DSLR with Wide-T-Ring ***# 2408332***	***52,3 mm***
Nikon DSLR with Wide-T-Ring ***# 2408333***	***54,9 mm***
Sony Alpha/Minolta DSLR with Wide-T-Ring ***# 2408334***	***52,8 mm***
Canon R with Wide-T-Ring ***#2408336***	***28,3 mm***
Fujifilm X with Wide-T-Ring ***# 2408331***	***26 mm***
Nikon Z with Wide-T-Ring ***# 2408335***	***24,3 mm***
Sony E/NEX with Wide-T-Ring ***# 2408317***	***16,2 mm***

Heavy Duty M48 Quick Changing System

The Heavy Duty M48 Quick Changing System ***# 2958593*** *with an optical length of 15 mm consists of Baader M48 Quick Changing Ring* ***# 2958895*** *with male M48 thread and Baader M48 Heavy Duty Quick Changer* ***# 2958890*** *with female M48. It is used to set the camera orientation or to remove it to look into the eyepiece. Both parts are also available separately.*


M48 Quick Changing Ring


M48 Quick Changer

Adaptation of Solar System Imagers or Video Modules with a T-Adapter

To image the planets through a telescope, you need a video module, which can capture many images in a short time, as well as a telescope with a long focal length. Cameras with small pixels require only a 2x- or 3x-Barlow; for even higher f-ratios, eyepiece projections is a common method. The equvalent focal length is calculated as described on the previous page as:

$$f_{equivalent} = f_{telescope} \times ((a/f_{eyepiece})-1)$$

The perfect f-ratio depends on the pixel size of the camera. It is calculated as N ≤ d_{pixel}/0,28. N is the number of the f-ratio and d_{pixel} is the length of the edge of the camera's pixels.

Adapting to a Camera Lens:

Use these adapters to attach cameras with a C-Mount-thread directly to camera lenses with Nikon-, Canon- or Pentax-S-bajonet:

 # 2958525 C-Mount Canon EOS

 # 2958535 C-Mount Nikon

 # 2958530 Special C-Adapter for the old Pentax-S (= T-1) thread

1¼"

Video modul/ solar system imager with 1¼" nosepiece, e.g. QHY5

 # 2458100
ClickLock Eyepiece Clamp 1¼" with diopter-adjustment

 # 2458125
Focusing Eyepiece Holder 1¼"

C-Mount

Video modul/ solar system imager with C-Mount-thread, e.g. QHY5 with C-mount-adapter

#2958520
1" C-Mount T-2 adapter with integrated 1¼" Filterholder

#2958520I
1" C-Mount T-2 adapter with mounted UV/IR Cut Filter

T-2

#1508153
40mm T-2 extension

#1508154
15mm T-2 extension

#1508155
7,5mm T-2 extension

#2956946
Varilock 46 variable extension, 29-46mm

#2956929
Varilock 29 variable extension, 20-29 mm

OPFA
Eyepiece Projection adapter for eyepieces with an outer diameter of up to 38mm.

Telescope-sided connection:
 # 2458141 – 1¼"
 # 2458142 – 2"
 # 2458143 – 2" SC-thread
 # 2458144 – T-2 inner thread
 # 2458145 – M44 Zeiss thread
 # 2458146 – M43 Vixen thread
 # 2458147 – M36,4 Vixen/TAK/ Lichtenknecker

M43

Hyperion® / Morpheus® T-Adapter M43/T-2
 # 2958080

Eyepiece with M43-thread, e.g. Morpheus® or Hyperion®

For eyepieces without thread:

At telescopes, the OPFA gives you the option to use eyepieces with an outer diameter of up to 38 mm for eyepiece projection. The T-ring of the camera can be connected directly to the T-2-thread.

Effective Focal Lengths of selected CELESTRON spotting scopes with a standard T-adapter (55 mm flange back)

With 40 mm spacer tube (up to full frame) e.g. 40 mm extension tube #1508153

	Magnification of the eyepiece	Equivalent focal length with standard T-2 sdapter			Extension tube
		Vollformat	APS-C (Crop 1,5)	Micro Four Thirds	
Ultima 65	18x	1360 mm	2040 mm	2720 mm	1x 40 mm
	55x	4853 mm	7279 mm	9705 mm	1x 40 mm
TrailSeeker 65 / Regal 65	16x	1142 mm	1713 mm	2284 mm	1x 40 mm
	48x	4198 mm	6297 mm	8396 mm	1x 40 mm
Ultima / TrailSeeker / Regal 80	20x	1420 mm	2130 mm	2840 mm	1x 40 mm
	60x	5220 mm	7830 mm	10440 mm	1x 40 mm
Ultima 100	22x	1550 mm	2325 mm	3100 mm	1x 40 mm
	66x	5730 mm	8595 mm	11460 mm	1x 40 mm
TrailSeeker / Regal 100	22x	1550 mm	2325 mm	3100 mm	1x 40 mm
	67x	5825 mm	8738 mm	11650 mm	1x 40 mm

With 30 mm spacer tubes (up to APS-C) e.g. 2x #1508154 or 1x #1508154 and T-2 quick-changer system

	Magnification of the eyepiece	Equivalent focal length with standard T-2 sdapter			Extension tube
		Vollformat	APS-C (Crop 1,5)	Micro Four Thirds	
Ultima 65	18x	1176 mm	1765 mm	2353 mm	2x 15 mm
	55x	4301 mm	6452 mm	8602 mm	2x 15 mm
TrailSeeker 65 / Regal 65	16x	981 mm	1472 mm	1962 mm	2x 15 mm
	48x	3715 mm	5573 mm	7431 mm	2x 15 mm
Ultima / TrailSeeker / Regal 80	20x	1220 mm	1830 mm	2440 mm	2x 15 mm
	60x	4620 mm	6930 mm	9240 mm	2x 15 mm
Ultima 100	22x	1330 mm	1995 mm	2660 mm	2x 15 mm
	66x	5070 mm	7605 mm	10140 mm	2x 15 mm
TrailSeeker / Regal 100	22x	1330 mm	1995 mm	2660 mm	2x 15 mm
	67x	5155 mm	7733 mm	10310 mm	2x 15 mm

Without spacer tubes (only for smaller chips) Image will be vignetted and distorted when using larger camera sensors

	Magnification of the eyepiece	Equivalent focal length with standard T-2 sdapter			Extension tube
		Vollformat	APS-C (Crop 1,5)	Micro Four Thirds	
Ultima 65	18x	625 mm	937 mm	1250 mm	–
	55x	2647 mm	3970 mm	5294 mm	–
TrailSeeker 65 / Regal 65	16x	499 mm	748 mm	997 mm	–
	48x	2268 mm	3402 mm	4536 mm	–
Ultima / TrailSeeker / Regal 80	20x	620 mm	930 mm	1240 mm	–
	60x	2820 mm	4230 mm	5640 mm	–
Ultima 100	22x	670 mm	1005 mm	1340 mm	–
	66x	3090 mm	4635 mm	6180 mm	–
TrailSeeker / Regal 100	22x	670 mm	1005 mm	1340 mm	–
	67x	3145 mm	4718 mm	6290 mm	–

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