



Telecompressor Alan Gee II (Shapley-Lens f/5,9)

Telecompressor for Schmidt-Cassegrains
for visual and photographic use
Especially suited for use with CCD cameras
and Baader binoviewers

Manual



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BAADER PLANETARIUM^{GM}

Zur Sternwarte • D-82291 Mammendorf • Tel. +49 (0) 8145 / 8089-0 • Fax +49 (0) 8145 / 8089-105
Baader-Planetarium.de • kontakt@baader-planetarium.de • Celestron-Deutschland.de

Contents

2	Technical Data
3	Design of the Alan Gee
4	Largest possible field of view
5	Calculation of the compression-factor M
6	General Installation of the Alan Gee
6	Visual use with a 1¼" star diagonal
7	Visual use with 2" Baader star diagonals
8	The Alan Gee in combination with a binoviewer at Schmidt-Cassegrains and EdgeHD
9	Visual use at a Baader (Giant) binoviewer with Zeiss-micro-bayonet
10	Photographic use with a DSLR at the 2"-SC-thread of the telescope
11	Photographic use with a DSLR at the 2" eyepiece holder of the telescope
12	Photographic use with CCD cameras (only for Schmidt-Cassegrains)
12	Fixed screw mounting of the camera on the Schmidt-Cassegrain
13	Flexible camera mounting with T-2 quick changer
14	Recommended accessories
16	General Tipps
16	Important: Focusing SC-telescopes

Technical Data

Weight:	90 g
Focal length:	259 mm
Ideal working distance:	121 mm to achieve a reduction factor of 0.59x
Reduction factor:	to f/5,9 at a distance of 121 mm, to ca. f/3,5 at a distance of 193 mm
Lenses:	Air-spaced dublet, multi-coated
Optimal image circle:	15 mm
Recommended sensor size:	Up to APS-C; remaining vignetting can be removed easily during image processing (cf. image p. 4)
Recommended telescopes:	Photography: Schmidt-Cassegrains Visual (monocular, binocular): Schmidt-Cassegrain, EdgeHD
Telescope adaptation:	Fits into T-2 tubes and SC-baffles
Free aperture:	35 mm, fits into 8" and larger Schmidt-Cassegrain

Design of the Alan Gee

The desire for „two telescopes in one“ is old, but due to the laws of optics, all approaches to it must make compromises. A telecompressor should illuminate the 24x36mm picture format as well as possible (to minimize vignetting), and it should avoid image distortion – especially the inevitable astigmatism. You should also be able to use it with accessories like star diagonals or binoviewers which have a long optical path. The standard telecompressors of the major manufacturers are designed for rather short distances to the sensor/film and are not suitable for use with binoviewers.

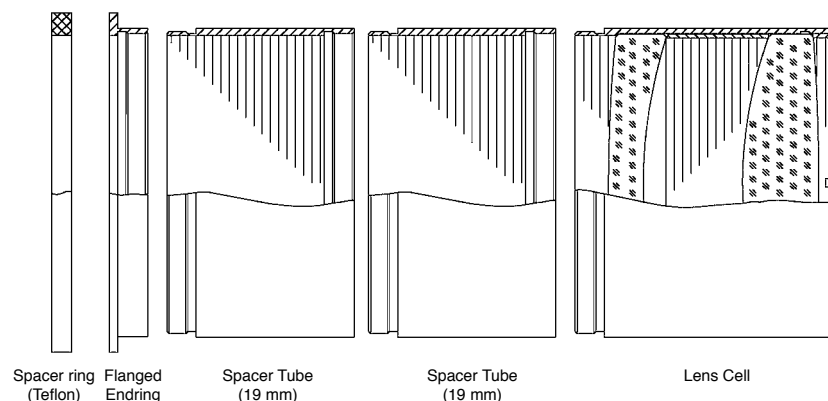
You can reconfigure the Alan Gee II telecompressor to adapt it to different optical accessories. For photographic application, you may have to insert the multi-coated achromatic lenses into the baffle tube of the telescope, or – for the visual use with a binoviewer – mount the lens carrier together with the lens holder **immediately in front of the entrance aperture of a binoviewer**.

The construction takes two conditions into account: To make maximum use of the baffle's diameter, and to keep the lock secure. Despite the resulting thin housing, the individual tubes are securely connected by fine threads.

The optics were designed specifically for Schmidt-Cassegrain telescopes according to the recommendations of Alan Gee and Roland Christen. The two air-spaced lenses have a focal length of 259 mm and a flat field. To achieve the best correction, they should be placed – according to theory – at no more than half of that focal length away from the focal point of the eyepiece or the image plane of the camera. The ideal distance between the camera-side lens and the focal point (field stop / camera sensor etc.) is 121mm, according to Roland Christen. Because of this, there are different combinations of the spacer tubes for each use. Each spacer tube has got a length of 19 mm.

A longer distance will give you a faster f/ratio, but it will also decrease the field of view.

The parts of the Alan Gee Telecompressor II



Largest possible field of view

Telecompressors are mainly used in **photography**, as they lead to a brighter image and significantly shorter exposure times. However, you cannot enlarge the maximum field of view of a telescope, as this is physically limited, for example, by the focuser or – in the case of a Schmidt-Cassegrain – by the baffle diameter. Vignetting therefore occurs with full-frame cameras, which must later be eliminated in image processing. With APS-C cameras, vignetting practically no longer interferes.

For **visual observations**, the Alan Gee telecompressor can show its strengths especially when 2" accessories can't be used – whether because of the diameter of the baffle or because of the eyepiece's diameter. This is the case, for example, with bino-viewers designed for 1¼" eyepieces, but also with the Celestron 5" and 6" Schmidt-Cassegrains, on which long focal length 2" eyepieces will vignette. With a C8, only very long focal length 2" wide angle eyepieces will show vignetting.

Baffle diameters of Celestron SC-Telescopes

Telescope	baffle Ø
C11, 14	54 mm
C9½	46 mm
C8	37 mm
C5, C6	27 mm*

*not compatible with Alan Gee

For visual purposes, it is usually better to use 2"-accessories instead of a telecompressor. This way, you can reach a larger field of view in addition to the lower magnification and the brighter image (larger exit pupil) when using a telecompressor. On the other hand, a good 2"-eyepiece and star diagonal cost a significant amount of money



Aufnahme mit einer Sony Alpha 7S Vollformatkamera, dem Alan Gee und einem C8. Rot eingezeichnet ist das Bildfeld einer APS-C-Kamera. Es hat eine Kantenlänge von etwa einem Grad, was auch dem maximalen Bildfeld eines 35mm-Okulars am C8 mit dem Alan Gee entspricht.

and can't be used with every telescope. Our Maxbright- and BBHS-mirrors combined with Hyperion Aspheric eyepieces provide a large field of view combines with a low magnification and comfortable observing.

Calculation of the compression-factor M

according to Michael Covington: Astrophotography for the Amateur.

Telecompressor focal length: $F_2 = 259$ mm

Flange focal distance for DSLR-cameras with T2-adapter (all manufacturers): 55 mm

Distance between rear lens of the telecompressor and T-ring – with BTA-adapter and all spacer tubes according to the image on top of page 10: 66mm

This results in the distance S_2 between the rear lens of the compressor and the camera sensor as

$$S_2 = 55 \text{ mm} + 66 \text{ mm} = 121 \text{ mm}$$

The (negative) elongation factor M is calculated as follows:

$$M = (S_2 - F_2) / F_2 = (121 - 259) / 259 = -0,533$$

The minus sign can be ignored for the further calculations.

If you focus with the inserted telecompressor, the focus of the telescope must be moved relatively far to the outside, by the distance S_1 . The calculation is:

$$S_1 = S_2 / M = 121 / 0,533 = 227 \text{ mm}.$$

This value is added to the focal length of the telescope. A Celestron 8 with $f=2030$ mm for example will have a resulting effective focal length of 2257mm. This would mean an effective f-stop of $2257/203 = 11.1$ for the C8 without telecompressor. With the telecompressor, it has got an effective f-stop

$$M_{\text{eff}} = 11,1 \times 0,533 = 5,9 \text{ (= focal ratio)}.$$

This value agrees well with the values measured directly at the C8.

The shortening of the exposure time results from $M^2 = 0.35$, that is about 1/3.

General Installation of the Alan Gee

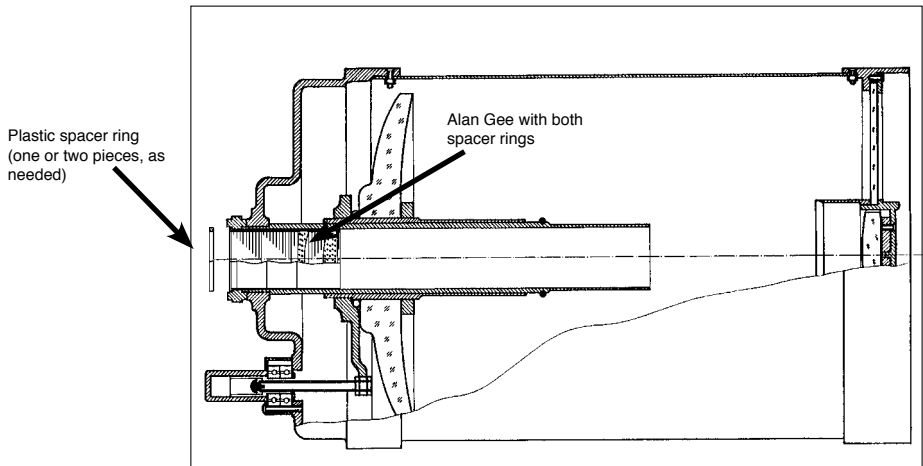
In the simplest case, the Alan Gee is inserted directly into the baffle tube of the telescope, as the illustration below shows using the example of a C8. First unscrew the 1 1/4" Visual Back. The Alan Gee is then fixed with the Visual Back; one or two plastic spacers (depending on the depth of the recess) between the Alan Gee and the Visual Back ensure that it retains its position. The Celestron C11 and C14 are mounted in the same way.

The Celestron C9 1/4 Schmidt-Cassegrain has a larger baffle tube diameter. To position the Alan Gee correctly under the Visual Back in these models without falling into the telescope, you need the **Centering Ring for Alan Gee II Telecompressor # 2454410**.



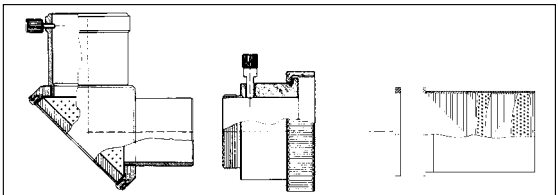
Centering ring for Alan Gee II
2454410

Celestron C8 with Alan Gee II Telecompressor inserted into the baffle tube



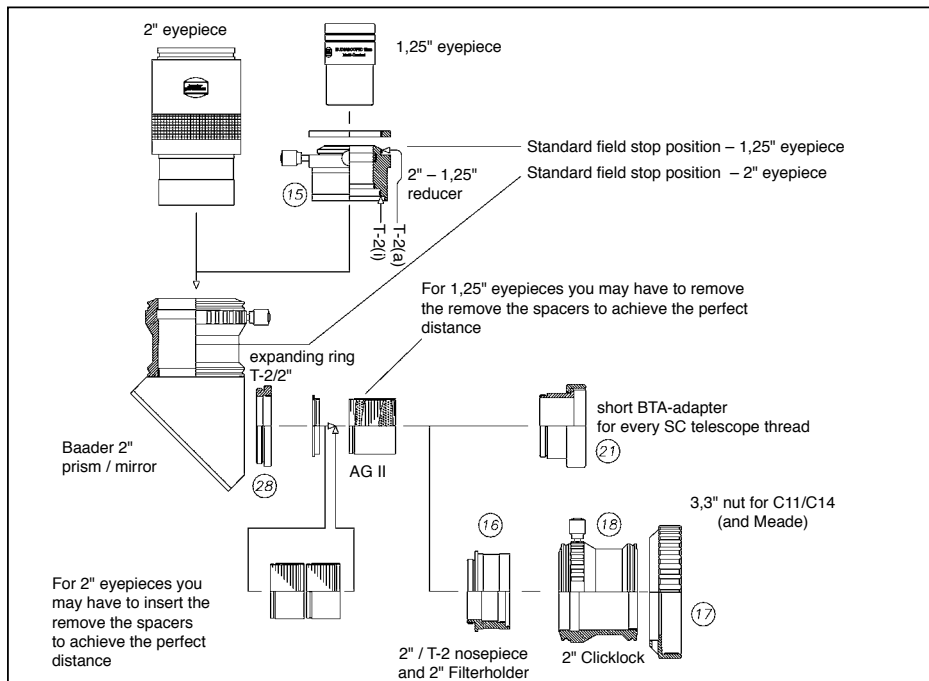
Visual use with a 1 1/4" star diagonal

1. Insert the telecompressor (with only one 19 mm extension) completely into the baffle of the telescope (for the C9 1/4, use the centering ring # 2454410).
2. Insert the white spacer into the filter recess on the telescope's connection thread. Use one or two, depending on the depth of the recess.
3. Now re-attach the visual back with the 2" coupling ring at the telescope as usual.
4. Insert the star diagonal completely into the Visual Back and lock it.
5. Now, you can use any 1 1/4" eyepiece as usual.



Visual use with 2" Baader star diagonals

If you have a Baader 2" star diagonal (mirror or prism, e.g. 2" Clicklock, MaxBright, BBHS) with integrated SC-thread in the housing, you can mount the Alan Gee II Telecompressor directly in front of the mirror cell between a T-adapter (#21) and a reducer ring (#28). With star diagonals by other manufacturers, it may be necessary mount the Alan Gee inside of the telescope's baffle tube and thus lose field of view. The longest useful focal length for an eyepiece is 40mm. You can find the optical length of the star diagonals in their technical data, e.g. on our website.



The Alan Gee in combination with a binoviewer at Schmidt-Cassegrains and EdgeHD

The Alan Gee must be mounted directly in front of a binoviewer (which has got a light path of ca. 11cm), the glass path corrector has to be removed. As the Alan Gee is inserted into the light path behind the star diagonal instead of the baffle tube, it can also be used with EdgeHD-telescopes for binocular use. Even with the best coatings, there may be reflexions at very bright planets. But for practical use this does not matter, because typically planets will not be observed with a telecompressor – the shortened focal length would be of no use when observing planets at high magnifications, anyway.

Examples for Field of View:

Alan Gee for visual use with bino-viewers

Baader Zeiss binoviewer on 8" SC telescope C8, connected with 16mm BTA adapter + T-2 prism + 40mm T2 tube. Telecompressor lens with flange mounted directly in front of the Bino (only in this configuration the focus can be reached)!

True field measured with the drift method:

2x35mm Baader-Eudiascopic eyepieces: effective field size is $1^{\circ} 12'$

(for comparison: without the Alan Gee II telecompressor = $0^{\circ} 30'$).

Actual field gain is: 576%!

Baader Zeiss-Binoviewer equipped as above and attached to the **Celestron 14**.

True field measured with the drift method:

2x35mm Eudiascopic eyepieces: $42'$

(for comparison: without Alan Gee II telecompressor: $23'$).

The effective gain of field amounts to: 333%!

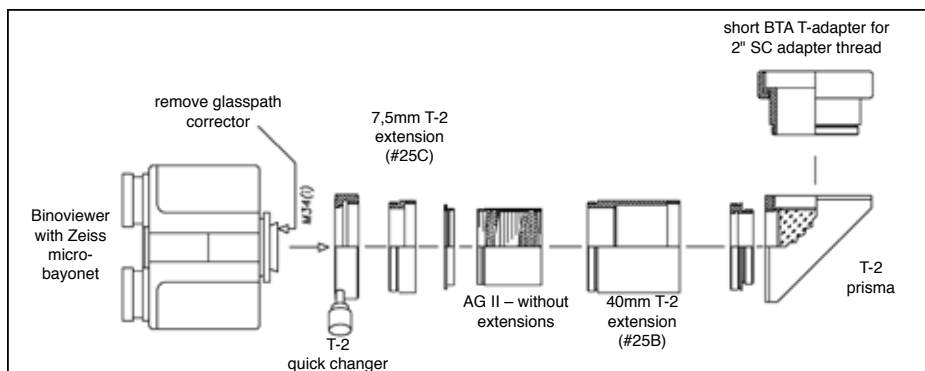
This field of view is also comparable to that of an APS-C camera sensor, cf page 2!

Visual use at a Baader (Giant) binoviewer with Zeiss micro-bayonet

To use the Alan Gee with a Baader (Giant) Binoviewer, the Alan Gee must be mounted directly in front of the binoviewer, behind the T-2-prisma. For this you need a T-2 extension tube 40 mm (T-2 part #25B) # 1508153.

The Alan Gee is mounted without its 19mm extension tubes between the T2 quick changer and the 40mm T-2 extension. The 40mm-extension is used to attach it to the star diagonal. The 7,5mm extension locks the Alan Gee into position and is optional – this can also be done with the quick changer, but the 7.5mm extensions provides more stability.

The BTA-Adapter #2408160 is used to attach binoviewer and star diagonal securely with the SC-thread of the telescope. The single locking screw of the visual back is not strong enough to hold binoviewer and eyepieces in place.

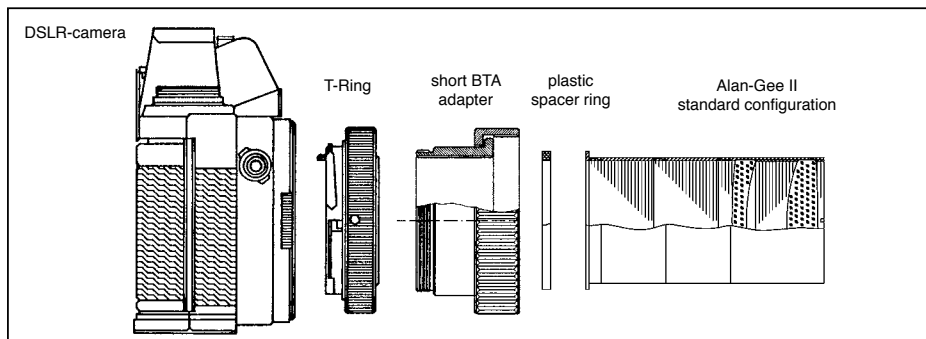


Photographic use with a DSLR at the 2"-SC-thread of the telescope

Setup (potographic use): Remove the visual back from the back of the C8/C9¼, so that you can access the 2" SC thread. In case of the C11/C14, the reducer from 3" to 2" thread remains at the back of the telescope.

For the C9¼, you need the centering ring for Alan Gee II, # 2454410.

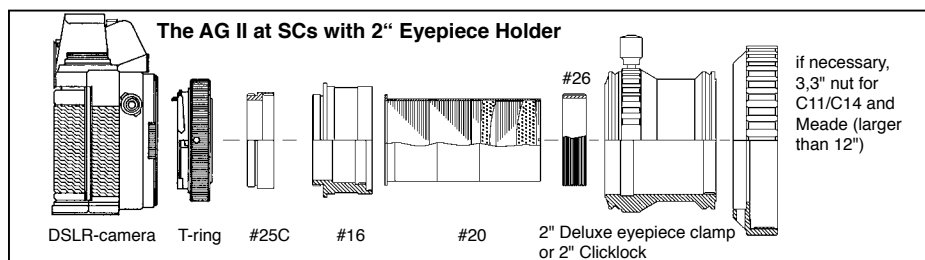
1. Insert the Alan Gee II into the baffle of the telescope (and into the centering ring, in the case of the C9¼) until it stops.
2. Insert the white plastic spacer ring into the filter notch at the telescope's adapter thread. The telescope should point downwards a little bit for this.
3. Now screw the short BTA adapter onto the telescope's 2" SC thread.
4. Attach your DSLR with a matching T-adapter to the T-thread of the short T-adapter.



Photographic use with a DSLR at the 2" eyepiece holder of the telescope

If you use a 2" eyepiece holder (e.g. a 2" Clicklock for SC, #2956220), you can use your DSLR also with it.

1. Insert the Alan Gee (in its standard configuration with both spacer rings) into the 2"/T-2-adapter #16 (# 2408150)
2. Lock it with the T-2 inverter ring #26 (# 1508025)
3. To achieve the correct distance to the camera sensor (for the T-2 flange focal distance of 55 mm from T-thread to camera sensor), you need to insert an additional 7,5 mm T-2 extension tube #25c (# 1508155) between the 2"-nosepiece and the T-ring of your camera.



Photographic use with CCD cameras (only for Schmidt-Cassegrains)

To connect a CCD camera, you must know the flange focal distance of your camera. For a DSLR with T-ring, it is standardized to a flange focal distance of 55 mm (measured from the upper edge of the T-ring); with astronomical CCD cameras, there is no standard. The Schmidt-Cassegrain is only operating with the correct focal length if the sensor is used at the specified distance from the rear of the telescope. For the EdgeHD, Celestron offers special reducers suitable for full format sensors; the values of the EdgeHD in the table on the right are nevertheless interesting for use with a bino-viewer.

The Alan Gee can only be used in the baffle of Schmidt-Cassegrains because of the corrector built into the baffle of the EdgeHD. Photographic use on the EdgeHD is not possible, please use the special EdgeHD reducers for these telescopes!

Backfokus of Celestron SC- and EdgeHD-telescopes

measured from the base of the SC-thread

Telescope	Backfokus
C9¼, 11, 14	139 mm
C8	127 mm
EdgeHD 9¼, 11, 14	147 mm *)
EdgeHD 8	133 mm *)

*) not compatible with Alan Gee for photography

Fixed screw mounting of the camera on the Schmidt-Cassegrain

You can screw your CCD camera firmly to the telescope. This gives you an extremely rigid connection, although you cannot easily rotate the camera to adjust the image section – but it is possible with the nut of the BTA.

For this purpose, the Alan Gee Telekompressor II is inserted completely with both 19mm extension tubes into the Schmidt-Cassegrain baffle tube and fixed with the BTA adapter and one or two plastic spacer rings. To achieve a focal length reduction to f/5.9, the camera sensor must be positioned 121 mm from the upper lens edge.

The two 19 mm extensions of the Alan Gee have a total length of 38 mm, the BTA T-adapter 20 mm (including the intermediate ring and the lens holder of the Alan Gee) makes 58 mm.

Now you have to subtract the flange focal distance of your camera from the desired distance of 121 mm – for example 17.5 mm for an SBIG STT8300M. This leaves a distance of 121 mm - 58 mm - 17.5 mm = 45.5 mm, which you must bridge with T-2 extension tubes.

You can either use a 40mm tube, then you have a distance of 115.5mm and an effective aperture ratio of about f/6, or you can use different spacers or the VariLocks to adjust the distance exactly.

The length of further accessories such as filter drawers, filter wheels or off-axis guides are also included in the distance. If necessary, you can also remove one or two spacers from the Alan Gee to provide additional clearance for these parts.

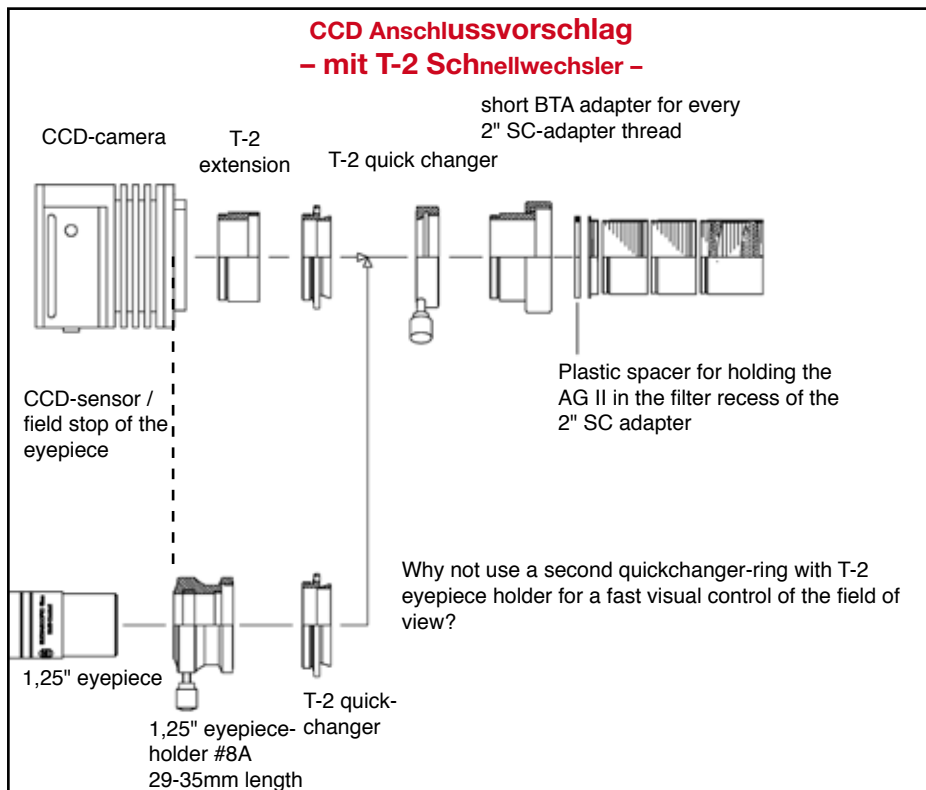
Flexible camera mounting with T-2 quick changer

Instead of screwing the camera firmly to the telescope, we recommend using a T-2 quick changer instead. This allows you not only to align the camera more easily than with the coupling nut of the BTA, but also to easily replace it with an eyepiece.

The Alan Gee telecompressor II (with only one extension sleeve) is fixed with the BTA adapter in the telescope's baffle tube. The camera is connected to the BTA via a T-2 quick changer and, if necessary, additional extension rings to achieve the desired distance and shortening factor.

It is now convenient to use a second T-2 quick-change ring (# 2456320) and a focusable T-2 eyepiece clamp. Then you can quickly switch between camera and eyepiece to focus more quickly or check the image section. For most 1¼" eyepieces, the field stop is usually at the level of the transition from the housing to the push-in sleeve. If you bring the upper edge of the eyepiece clamp to the same distance as the camera sensor, you usually do not need to refocus when switching between camera and eyepiece.

Moving the Alan Gee closer to the BTA also leaves you enough room to install a filter wheel or a filter drawer such as the Baader UFC (Universal Filter Container). The overall length of the Baader UFC in the configuration for T-2 connection is 16 millimetres.



Recommended accessories

BTA # 2408160

Baader T Adapter (BTA) for SC & MAK Telescopes (T-2 #21)

Is used to mount the Alan Gee in the baffle of a Schmidt-Cassegrains, and for the photographic use of the Alan Gee at Schmidt-Cassegrain. Not suitable for EdgeHD-telescopes.



2408160

Centering ring for Alan Gee II Telecompressor (# 2454410)

Is needed only for the Celestron C9¼ benötigt, to place the Alan Gee inside of the baffle tube. The Alan Gee can't be mounted inside of a C9¼ without this ring.



2454410

T-2 extension tubes:

**40 mm (# 1508153) (T-2 #25B), 15 mm (1508154) (T-2 #25A),
7,5 mm (# 1508155) (T-2 #25C)**

These extension tubes are used to adjust the desired distance between the Alan Gee and camera or eyepiece.



1508155



1508154



1508153

Variable T-2-extension tubes:

VariLock 46 – lockable T-2 extension – 29-46mm (# 2956946) (T-2 #25Y)

VariLock 29 – lockable T-2 extension – 20-29mm (# 2956929) (T-2 #25V)

Variable T-2 extension incl. locking ring – 12-16mm (# 2958130) (T-2 #33)

These extensions can be set precisely to the desired length, to give you a more perfect control of the distance between camera and Alan Gee.



2958130



2956946

TQC/TCR Heavy duty T-2 Quick Changing System (# 2456322) Complete T-2 Changing System (T-2 parts #06 + #07) (# 2456321)

The two T-2 Quick Changing Systems each contain one T-2 Change Ring with Zeiss micro bayonet (T-2 part #7) (# 2456320) and as counterpart either the Heavy Duty TCR T-2 quick changer (T-2 part #6A) (# 2456313A) or the simple T-2 Standard Quick Changer (T-2 part #6) # 2456313. The Heavy Duty Quick Changer has got an improved locking mechanism and is recommended for heavy accessories (binoviewers, cameras), while the standard version is recommended for lighter accessories like eyepieces.



2456322

Focusing eyepiece clamps

Focusing Eyepiece Holder 1¼" / T-2 with fine focus (# 2458125) (T-2 #8A)

ClickLock Eyepiece Clamp 1¼" with fine focus (# 2458100) (T-2 #08)

Variable Locking / Sliding T-2 Focuser (# 2458010) (T-2 #24)

You can use an eyepiece holder in combination with a T-2 quick changer to switch easily between eyepiece and camera and to check the field of view. The fine focus makes it possible adjust the focus without touching the telescope's focuser.



2458010



2458100

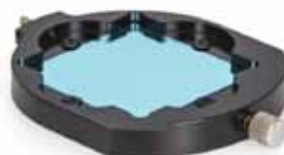


2458125

Baader UFC (Universal Filter Changer)

The Universal Filter Changer can be adapted to almost all telescopes, you just have to change the adapter threads. This way, you can use up to 65 mm of free aperture on the telescope side. For a T-2-system like the Alan Gee, you need the UFC Base (# 2459110), the T-2 (m) camera adapter (# 2459115) and the T-2 (f) teleskop adapter (# 2459130). In this configuration, the filter holder has got a height of only 16 mm. By replacing the adapter threads, you can adapt it to other telescopes any time.

There are filter sliders for aquare 50x50 filters as well as for mounted 2" filter and un-mounted, round 50,4 mm filters as well as adapters for several other filter seizes.



General Tipps

All SC-telescopes have got some slight field curvature, which is improved – but not completely removed – by using a telecompressor.

You will achieve the best sharpness for visual observation if you use the center of the image for focusing at first. Turn the focuser counterclockwise (See the text about „Focusing a Schmidt-Cassegrain“ below). Once you see a sharp image, turn the focuser for another 1/12th of a turn in the same direction.

For photography, you'll achieve the best focus if you rotate the focusing knob counterclockwise until you see a sharp image in the viewfinder or display of the camera. Then move it for another 1/24th of a turn in the same direction.

If you are observing at high magnification or taking photos of the planets, please remove the Alan Gee II telecompressor. As long as you don't intend to do planetary work the AG II may remain mounted at the telescope permanently. In this case, it also works as a seal for the tube assembly.

The best 1¼" eyepiece for rich-field-observation is the 35 mm Eudiascopic eyepiece (identical in construction with the (long gone) 35 mm Celestron Ultima eyepiece). It has the largest field stop which can be used in 1¼" eyepieces. You can use also the 36 mm Hyperion Aspheric in 1¼" configuration – it is a 2" eyepiece, but its special design makes it possible to use it as a 1¼" eyepiece with a large true field of view.

Important: Focusing SC-telescopes

Please note that with all Schmidt-Cassegrains the main mirror has to be focused upwards! This is the only way to make sure that the weight of the mirror is on the upward facing side of the focussing spindle! Otherwise, the mirror will shift downwards (there are no threads without tolerances) while you're taking a picture, and the stars will gradually lose sharpness. If you turn the focuser the right way (counterclockwise), you'll avoid this mirror-shifting. Simply get used to do the last focusing steps always from the correct side, then mirror-shifting will be no problem, and the object will not move on your camera sensor!

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BAADER PLANETARIUM

Zur Sternwarte 4 • D-82291 Mammendorf • Tel. +49 (0) 8145 / 8089-0 • Fax +49 (0) 8145 / 8089-105
Baader-Planetarium.com • kontakt@baader-planetarium.de • Celestron-Deutschland.de