Woody's How To:
MallinCam MFR-5 Focal-Reducer

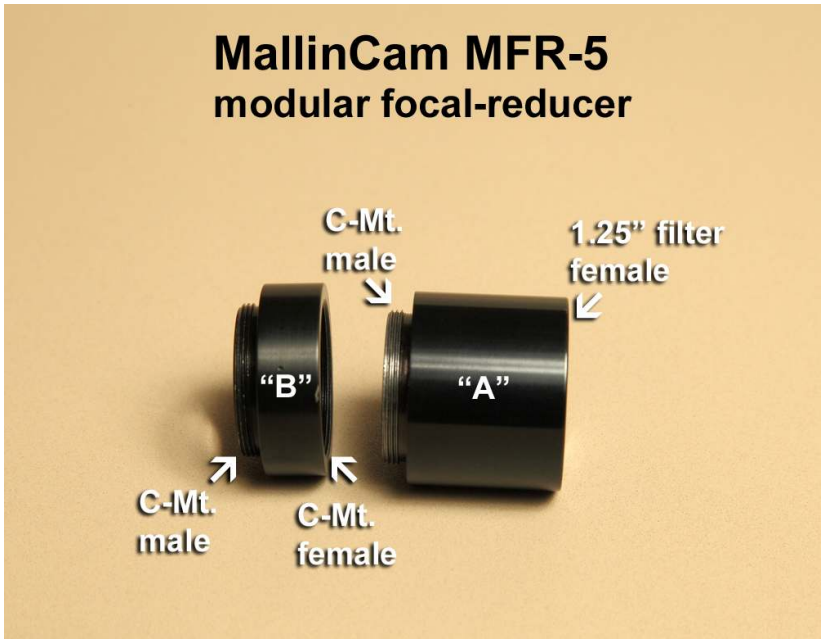
The *MallinCam MFR-5* modular focal-reducer is unique, flexible, can be configured in many ways -- and therefore is potentially confusing. This How-To document attempts to show and explain with photographs some of the various configurations possible.

Here are three images of a MFR-5 focal-reducer. It's a two-piece design and is made to mount on C-mt. video cameras, is 1.25" in diameter and has 1.25" filter threads on the end of the larger part I call the "A" part.

Depending on how you configure this unit, it can achieve different amounts of focal-reduction – from 0.8x to 0.3x or even more.

According to MallinCam, the MFR-5 is ideal for all telescope designs but particularly refractors, SCTs, RCs and DK optical designs.

It has been used successfully on curved-field and flat-field scopes and astrographs.



The MFR-5 has two parts that unscrew from each other. I call the left shorter part the "B" part and the longer part on the right the "A" part.

Since both parts have male C-mt. threads, both parts can be attached to the camera.

Just mounting the "B" part results in about a 0.8x focal-reduction. I've never used just the "A" part but I've been told it provides about a 0.75x focal-reduction by itself.

Standard 1.25" astronomical filters can be threaded into the end of the "A" part.

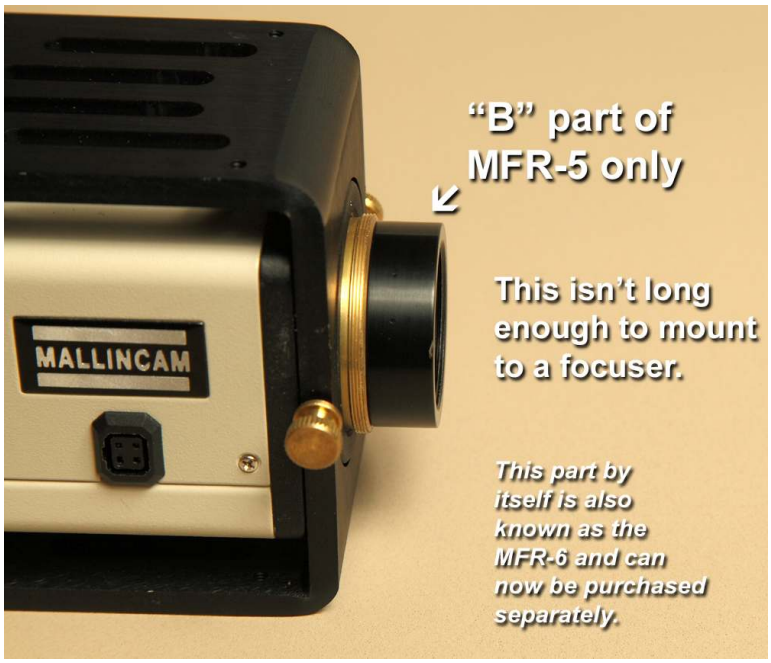
To fully utilize the MFR-5's capabilities and optimize it for the amount of focal-reduction you want – you might want assorted C-mt. extension tubes.

I got this nice set of Schneider C-mt. extension tubes from B&H Photo.

The two thin shims are 0.5mm and 1mm thick.

I believe Jack's Astro (MallinCam USA) sells 5mm and 10mm extension tubes also – and I'm sure much cheaper than this set.

So far, these two are the only ones I've really needed or extensively used – the 5mm and the 10mm.

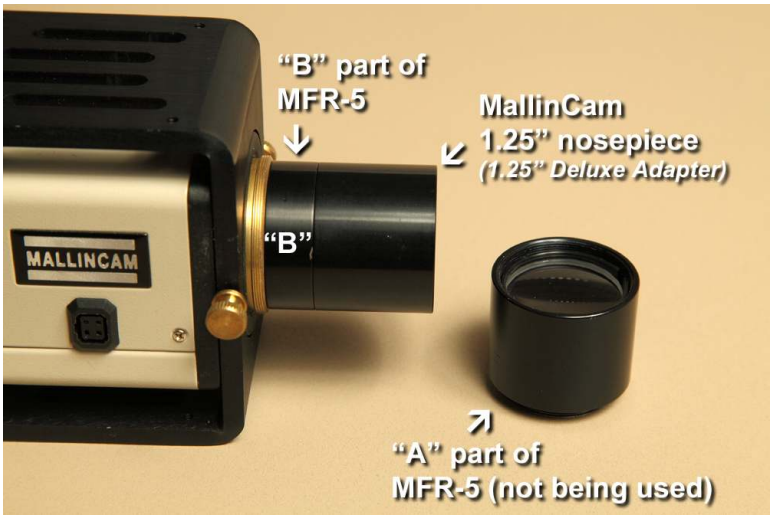


By separating the two parts and just screwing the shorter "B" part (a.k.a. MFR-6 and sold separately now) into the camera – you get the lowest amount of focal-reduction.

Depending on your scope and configuration, you can expect about 0.8x focal-reduction.

Many solar imagers find this configuration handy to fit the entire solar disk into their FOV.

But this is too short to insert into a focuser by itself. You need to add a 1.25" adapter to this to fit it into a focuser.



And here it is with a MallinCam 1.25" Deluxe adapter (nosepiece) screwed into the open end of the "B" part. This is the 1.25" nosepiece that came with my MallinCam Xtreme camera – you don't need to buy another one.

Now you can put the camera into a focuser. And just so you don't think I'm goofing you, there's the other "A" part of the MFR-5 next to it.

The "A" part of the MFR-5 and the MallinCam 1.25" Deluxe adapter look the same from the side and have the same dimensions – but the "A" part has a couple of glass lenses in it.

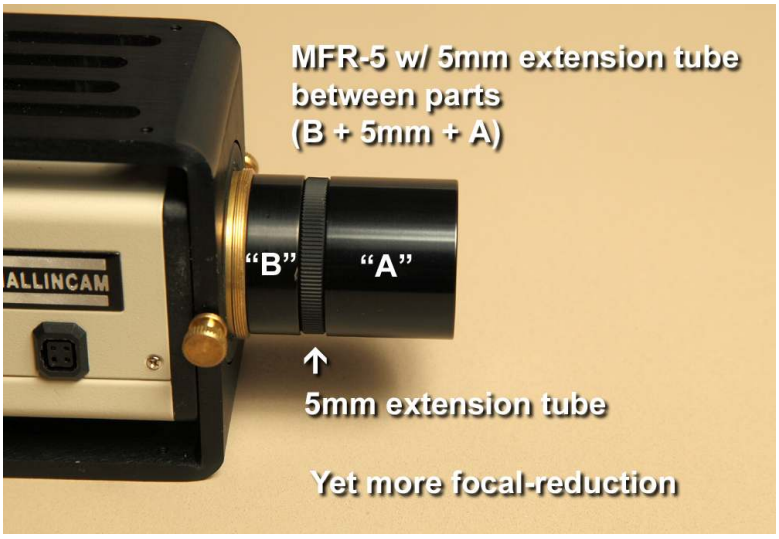
NOTE: When I use this setup on my William Optics 80mm refractor telescope, I get a circular reflection that takes up about 2/3 of the FOV. The resulting image is unacceptable in my opinion.

When I add a 5mm extension tube between the camera and "B" part the reflection disappears – until I expose for 30 sec. or longer. Then the reflection is back.

When I put a 10mm extension tube between the camera and "B" part the reflection completely disappears – even with exposures of 4 and a half minutes.

I've read that others have similar problems with certain scope/MFR-5 combinations – and that adding 5mm – 10mm of extension tubes between the camera and "B" part solves it.

HOWEVER -- I don't have this problem when the same setup is on a C9.25 SCT. This reflection problem only shows up with certain scopes.

	Here's the complete MFR-5 screwed together and mounted on the camera. This results in about a 0.6x focal-reduction. The amount of focal-reduction is dependent on each scope design, primary mirror position, thickness of external focusers on SCT scopes, etc. So different setups will result in different amounts of focal-reduction—even with seemingly similar scopes or MFR-5 configurations.
	For additional focal-reduction you can add extension tubes. The more you add – the more focal reduction you get. I'm an "Old-School" photographer and we called these things extension tubes in the day. So that's what I still call them. Schneider calls them extension tubes also. But many people call these things "spacers" or "extension rings" or "ERs" for short. They're all the same thing.
	Here's a setup I've successfully used on a Celestron C9.25" SCT with a JMI EV-1cm external focuser attached. I'm guessing this results in about a 0.4x reduction. So for a C9.25 that reduces the focal-length from 2350mm down to about 940mm (2350 x .4 = 940). I'm guessing on the reduction here so don't quote me or blindly believe me. But it's a substantial amount of focal-reduction.

You can also put extension tubes between the camera and the MFR-5. This also increases the amount of focal-reduction.

I wish I could tell you that putting the extension tube here is "better" or "worse" than putting it between the two parts of the MFR-5 – but so far I can't see any image quality difference. But adding the extension tube here seems to make a more dramatic focal-reduction difference.

There is one potential advantage to placing the extension tubes here – to remove internal reflections between the back of the MFR-5 and the camera's sensor – if you're getting one.

As I mentioned above – I have to add a 10mm extension tube here to get rid of the reflection when I mount this on my 80mm refractor.

NOTE: Let me point out here that when you add the MFR-5 your focus point changes – a lot.

And when you put extension tubes between the MFR-5 and camera – focus changes even more.

On the C9.25 I had to make something like 20 full turns of the primary mirror focus knob to get an image. Then I used the JMI external focuser for fine-focus.

Many people are so out of focus they can't see a thing and think the camera has died. Nope – it's just way out of focus.

And you can combine extension tubes between part "A" and part "B" at the same time as adding an extension tube between the camera and the back of the MFR-5. This can result in a LOT of focal-reduction – even too much!

I'm guessing this configuration with the C9.25 resulted in a focal-reduction of 0.3x – or a final focal length of just 705mm at f/3.

I used this combination on a C9.25 projected on a large screen for a star-party. I could see some vignetting (darkening at the corners) of the image which means I'd gone too far with my focal-reduction. Next time I'll probably take out one of the extension tubes.

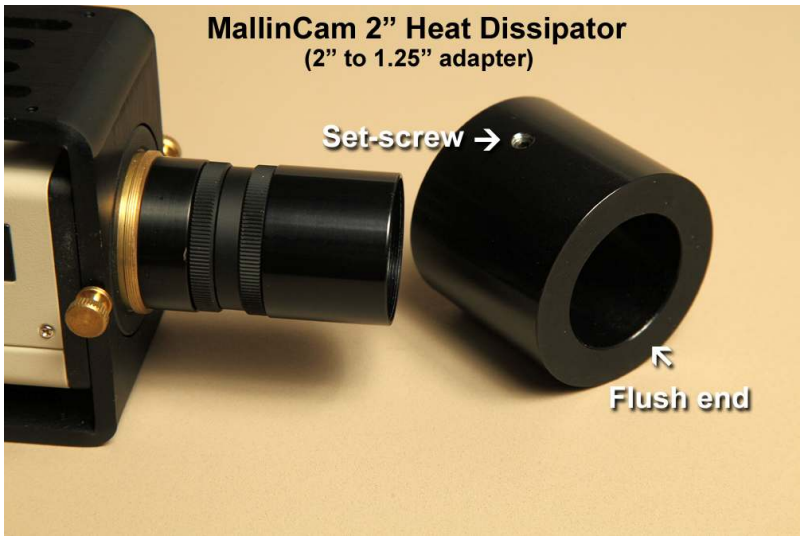
Sticking this combination of MFR-5 and various extension tubes into most 2" to 1.25" adapters can be an optical disaster!

In my case the Schneider extension tubes are smaller in diameter than the rest of the MFR-5 – which usually results in a wobbly connection to the focuser – resulting in off-axis and collimation problems.

Most 2" to 1.25" adapters only make contact at one end – and some make as little as 16mm of contact (5/8") – which isn't enough to hold the camera straight on axis to the scope.

This results in the camera being off-axis and not in columniation with the scope. You get odd looking distorted elongated stars – particularly at the corners.

I now have quite a collection of 2" to 1.25" adapters – mostly bad.



In my opinion only three of mine are acceptable – the Moonlite, Glatter Parallizer and this one made by MallinCam.

Although not perfect (and very expensive), this one seems to be the best and most versatile for me.

MallinCam calls it a *2” Heat Dissipator*” It’s a thick heavy machined aluminum sleeve that slips over the MFR-5 with extension tubes. It’s nominally 1.25” inside and nominally 2” on the outside. The term “nominally” is my only complaint with this one. More on this later.

It has a setscrew that tightens down on the MFR-5 to hold it firmly. And the setscrew is closer to one end than the other. So you can reverse it if the setscrew ends up being in the wrong place.

This adapter also isn’t the same on the ends. This end is flush. The other end is recessed.

Here’s the other end which is recessed.

The offset setscrew and recessed end make this adapter very versatile.

Here it is with the recessed end up against the camera.

The recess allows the camera lens mount to fit inside the adapter – so the adapter fits flush up against the camera – no gap.

But if this orientation doesn’t work for you – perhaps the set-screw is contacting in the wrong place – you can just reverse the adapter.

And here it is reversed.

And now my only complaint about this adapter (other than cost).

I wasn’t aware of this until another MallinCam owner with one of these brought it up – and I confirmed it by putting mine to the digital caliper test. The outside of this adapter isn’t exactly 2”. It’s considerably less than 2”.

In fact it’s smaller in diameter than any other 2” device I own!

When questioned, Rock Mallin said this is intentional. Since the camera heats up – and metal expands when it heats up – he didn’t want this adapter to get stuck inside somebody’s focuser. So he intentionally machines it smaller than the norm.

Hmmmmm. For me the result is mechanical slop – again resulting in some wobble and off-axis alignment to the scope. It’s still one of the best with less wobble than most – but it’s not perfect.

I’ll be experimenting with various thin aluminum shims – such as heavy-duty aluminum foil.