

BACK-BONE



INFINITE LENS OPTIONS

The Hero cameras feature an awesome, crisp and sharp wide angle lens in order to capture all the action, but this may not always be the look you're trying to achieve. With the option to change lenses filmmakers can easily get any look they want from this great camera – and you can use the original lens too!

Never before has there been a more versatile camera than the Ribcage AIR Modified GoPro Hero4. Its small size, light weight and astonishing shooting options make it a pocket sized powerhouse. It features native CS & C-Mount lens support as well as M12 lens compatibility. Almost any popular lens type can be attached with optional adapters including Canon, Nikon, Pentax and more! Take advantage of what professional lenses have to offer: manual focus control, a more cinematic depth of field, macro shooting, optical zoom and iris control. You'll receive a removable tripod mount so you can connect your camera to professional mounts and supports. Want night vision? Just take out the IR-cut filter so you can see in the dark with any IR light source! Have a difficult lens? Use the adjustable flange distance feature to get the perfect results.

The Ribcage is a modification for GoPro Hero3/3+ and Hero4 cameras. Built out of premium aluminum, the Ribcage allows you to connect the largest selection of lenses possible on a camera. Connect small M12, CS and C-Mount lenses, or use optional adapters to connect your favorite lenses.

All of the lens mounting rings are easily removable for filter exchange and sensor cleaning. Combine up to two custom filters in camera at the same time. You won't need filters for all your different lenses anymore, just for the camera! Now you can use **ND, cold mirror, NDVI and other custom wavelength filters** with your M12 lenses, or lenses that have no filter threads on the front. Choose from our line of tried and tested high resolution lenses, or use your own. Browse through our library of high resolution lenses to find the right lens for your needs!



WHAT LENS SHOULD I BUY?

That's probably the most common question we get asked and it depends on what you are looking to do with the camera. For reference the standard GoPro lens is 2.8mm, so 3-12mm are good for wide/medium shots. 16mm – 25mm are great for closeups with soft backgrounds and longer lenses are great for zoom and telephoto. Before getting into details, first let's look at the different lens types that the Ribcage supports without the need for an adapter.

M12

Also known as 'S-Mount' or 'Board lenses' They are lenses similar in size to the original GoPro lens. Typically these are best used for applications requiring small size and weight such as use with small drones and gimbals. This lens type typically has a fixed focus and fixed iris so they are meant to be set up once and locked in.

CS-MOUNT

These attach to the large mounting ring on the camera. CS-Mount was developed mostly for security applications so there are thousands of ultra sharp high megapixel lenses available at a relatively low cost. This lens type also commonly has 'IR-Corrected' or 'Day&Night' capability. That means they can focus on Infrared and visible light at the same time which a normal lens can't.

C-MOUNT

C-Mount was originally developed in the 1920's for film cameras and has been in use ever since. These can be attached to the camera by attaching the 5mm spacer ring. There are a vast array of C-Mounts available as they were commonly used on home movie cameras in the 50's and 60's, security and TV cameras and now for machine vision, factory automation and inspection applications that require the highest quality optics. You can buy vintage or new! While you can connect any M12, CS or C-Mount lens, 1/2.3", 1/2" and 2/3" lenses are best. The value in inches simply tells you the size of the image sensor the lens was originally designed for. The GoPro uses a 1/2.3" sensor. Ribcage has a crop factor of 5.6x for 35mm SLR lenses, so wide angle lenses are generally more useful.

1/2.3", 1/2", 1/1.8" and 2/3" M12, CS-Mount and C-Mount lenses are ideal.

1/2.5" lenses are 'technically' slightly too small for the sensor but in most cases give complete coverage and excellent results.

1/3" or 1/4" lenses are too small for the sensor to be used in wide mode, although they can still be used with the camera's 'medium' and 'narrow' shooting modes.

Auto iris lenses are not recommended as they require an external power supply in most cases. Focal lengths ranging from 4mm up to 25mm will prove to be most useful for general shooting. Focal lengths under 4mm will have a similar or more pronounced fish-eye effect than the stock GoPro lens unless they are labelled 'rectilinear' or 'low distortion'.

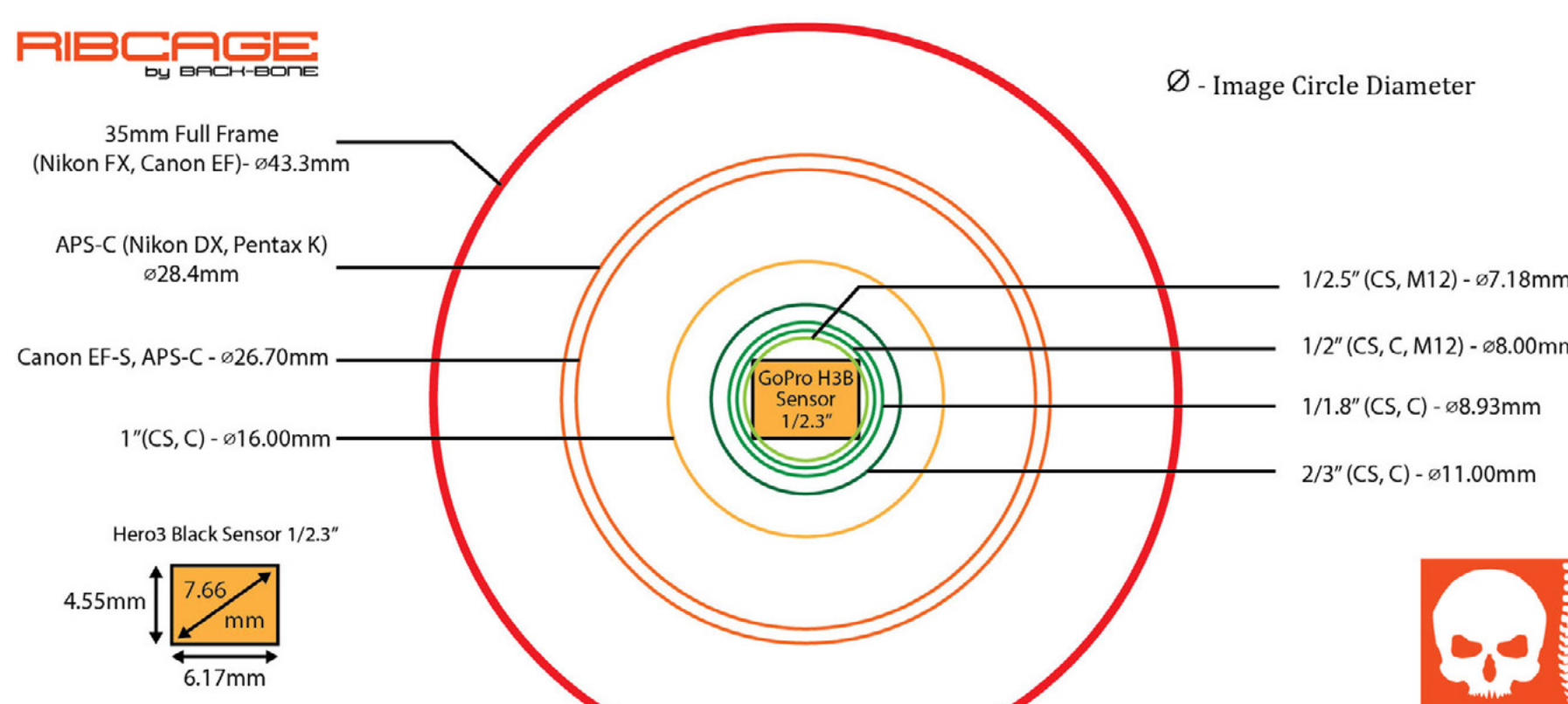
We've found it best to use lenses labelled 'HR' or 'Megapixel' for HD shooting. 3MP, 5MP and 10MP lenses should produce outstanding results.

If you want to use the optional night vision feature of the Ribcage, IR corrected or D&N (day & night) lenses are recommended. These lens types allow IR and visible light to be in focus at the same time.

Only lenses with manual features are supported. The GoPro is not capable of controlling fully automatic lenses. The built in M12 socket of the Ribcage will support M12 lenses with a maximum of 4.65mm back focus distance. At maximum distance the set screw may not engage. For M12 lenses requiring a longer back focal distance we offer an optional M12 to CS-Mount adapter which provides all the necessary distance required.

Brands we have tested and find to be generally quite good are Computar, Kowa, Tokina, Fujinon, and Tamron. A selection of recommended lenses can be found in our shop.

Visit <http://www.digifed.net/focallength/> for a magnification calculator. Choose the "Digital Compact with 1/2.3" Sensor" option. You can then punch in different focal lengths to see their 35mm equivalent. This is a great tool for deciding what focal length will best suit your needs.



Above is a crop factor diagram showing the image circles projected by the most common lens types in relation to the GoPro image sensor. You may find it helpful to visualize the crop factor.



This image shows the sensor area used by GoPro's different shooting modes. Medium mode gives you 75% field of view and Narrow mode will give you 50% field of view relative to the full sensor. These modes can be quite handy if you are using a lens smaller than the recommended 1/2.3". You can also get more magnification from a wide angle lens if you need to.



Ribcage on a Sigma 200-500mm f/2.8

Connect your favorite lenses with these C-Mount adapters!



C-Mount adapters and other various adapters



D-Mount cinematography lens

THERE ARE MANY GREAT ADVANTAGES TO ADDING A RIBCAGE MODIFIED GOPRO TO YOUR PRODUCTION. MAXIMUM FLEXIBILITY, SMALL SIZE, COST EFFECTIVE LENS CHOICES. HERE ARE JUST A FEW OF THE MANY REASONS TO PURCHASE OUR GEAR:

- The power of the GoPro Hero3/3+ and Hero4 camera lines only now with adjustable focus, zoom, depth of field and more
- You can buy and add several more cameras to your production at a much lower cost than renting other pro cameras
- Match the look of your other professional cameras by customizing your lens
- Use all of the lenses you already have with optional adapters
- Use our convenient EXOmini Mounting Bracket for pro mounting options
- Connect vintage lenses such as Bolex, D-Mount, 16mm, 8mm etc.
- Get a pro look from a camera that can fit in tight spaces.
- Super high frame rates and resolutions up to 4K (2160p)
- Sync multiple cameras to one remote control or smart device
- 1080p/60 HDMI out
- M12, CS and C-Mount lens compatibility – C-Mount has been in constant use since the 1920's!
- Super-high resolution lenses for a much lower cost
- Take advantage of small 3-axis gimbals for perfectly stable professional footage
- much, much more!



The Ribcage AIR supports both the Hero4 Black and Silver. It's available as a fully assembled camera or a modification kit for enthusiasts who already have a GoPro.

BACK-BONE

We would love to see what you have done with your Ribcage and be able to share it with the community!

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