
TITO FERRADANS
"ANAMORPHIC"
ON A BUDGET
2020 REVISED & EXPANDED EDITION
THE ORIGINAL ANAMORPHIC GUIDE!
THE WIDEST GUIDE ON SHOOTING DIY ANAMORPHIC!

**DISCLAIMER:** The original Anamorphic on a Budget guide is a result of its time. Things have changed, shops have closed, lots of new gear has flooded the market. Take this guide as-is. For the maximum and modern experience *check out my channel* and other guides!

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My graduation work at University of São Paulo in Brazil revolved around shooting with anamorphic lenses, Magic Lantern RAW and Canon cameras. The goal was to keep the budget as low as possible and maximize the experimenting.

The resulting document was written in Portuguese and I translated it in 2015 - ***as I started my channel*** - so more people could have access to my conclusions and would not take so much time going through the hit-your-head-against-the-wall research process.

This thing is around a hundred pages long, so it is thorough. I hope this work brings light onto common questions as well as plays a good follow-up read to the original ***EOSHD Anamorphic's Shooter Guide***. Keep in mind this was written by December 2013 and 4K was not a big deal yet. To give you some reference, Blackmagic was just starting to ship out their first cameras.

I used a Canon 5D3 for this research and the camera is the least important part of it. Some of the sections have not aged well - I have not used Magic Lantern in a while, having switched to Sony in 2016, then Panasonic in 2019.

To encourage you to go through this amount of text in a quest for answers, here is the end result of my project, a two-part episode for a webseries, created by me (I wrote, directed, shot, edited and did all post-production). Both parts are 100% anamorphic and will be carefully analyzed over the following chapters. Be sure to enable English subtitles!

# ZONA SSP (2013)

*Episode 01*

*Episode 02*

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# I – WHO AM I AND WHAT IS THIS ABOUT?

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One of the main things for me in photography is the strong connection between technique and creativity one has to make to achieve good looking results. Knowing how the camera works is not enough. We need to understand human vision, composition, colors, light, and find/develop our own style.

When I enrolled in film school back in 2010 I was already taking pictures and studying photography for a year and a half. It was my main hobby and entertainment while not studying the subjects that would get me into university.

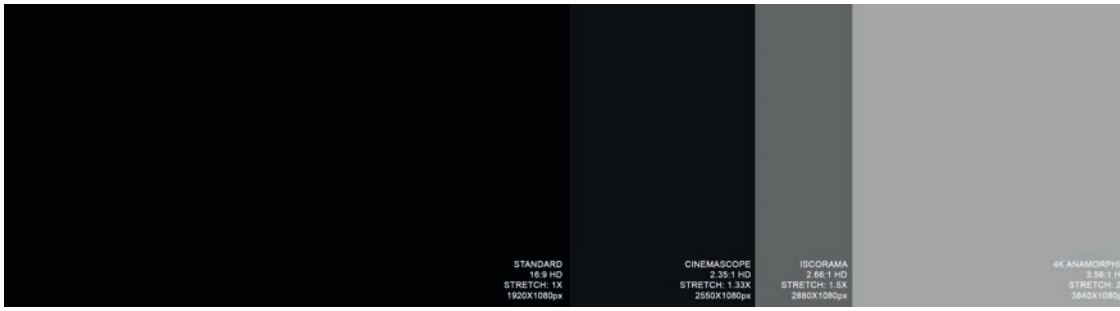
Coming from a math-based background (Computer Science at Federal University of Bahia), numbers were already exciting to me. Through my four years at film school I developed and emphasized the creative part of the photographic process as well - be it a single frame or 24 of them in a second.

During summer break in 2012 I was feeling bored and needed to learn something entirely new. I decided it would be an experimenting year, very different from the production-like work of the previous three years. Randomly roaming the web I came across a subject that had already caught my eye before: anamorphic lenses. It felt like the perfect time to go deeper into them. I was moving from 16:9 standards to something more movie-like as the 2.4:1 CinemaScope aspect ratio.

I had already come across the subject before around 2010 and read some articles about such lenses that would allow shooting CinemaScope straight from camera instead of cropping the frame. It was interesting but I lacked the technical knowledge to fully understand what was being said on those articles back then.

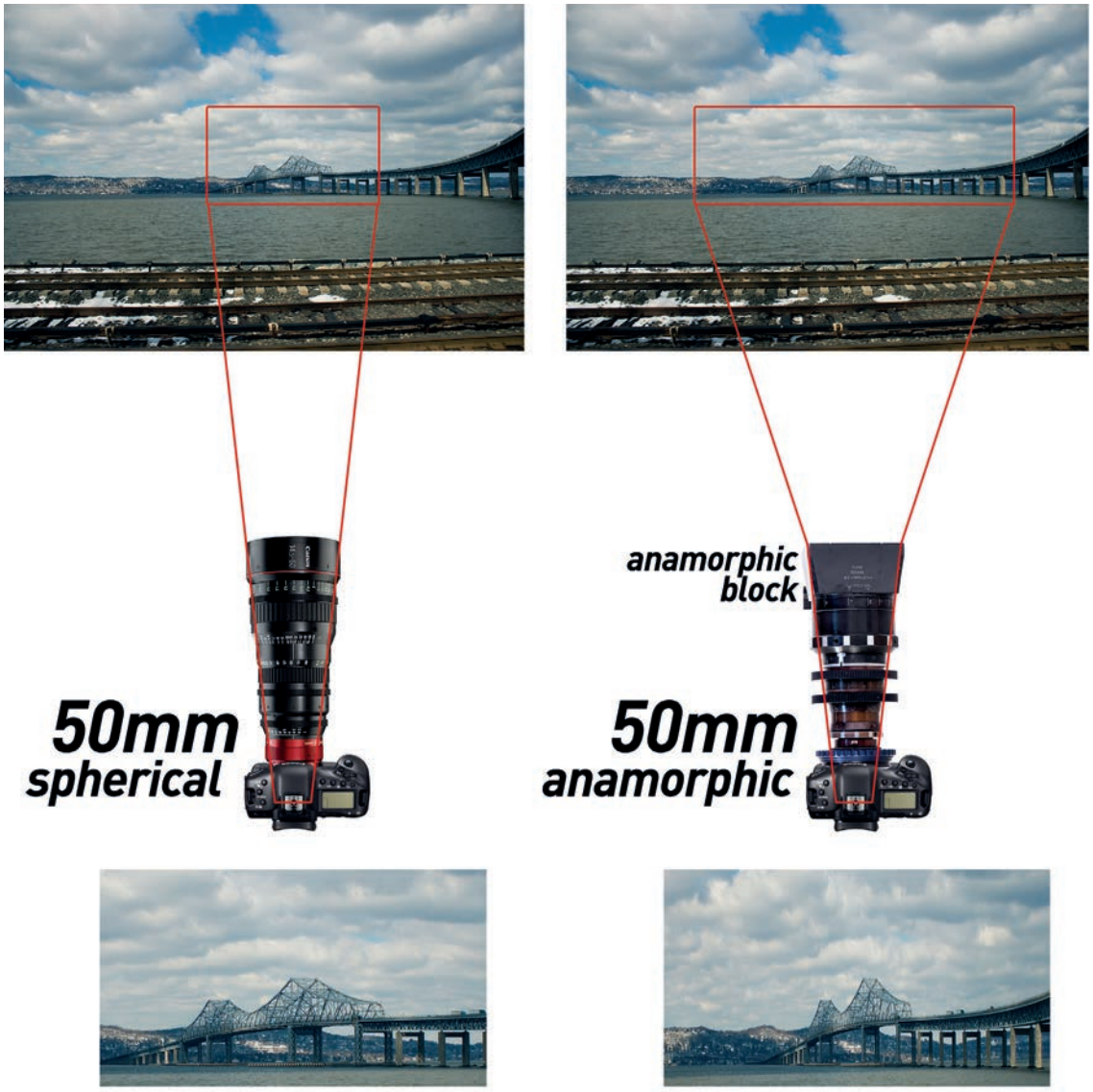
In the meantime whenever I considered shooting CinemaScope pictures, I always felt bad for discarding such a big part of the picture through cropping. Such a waste of money and production value, right?

Using the crop method for CinemaScope you either go ultra wide angle so you can frame your characters properly and end up with a ton of depth of field, or go with regular lenses and hope nothing too important ends up cropped off in post-production.




*Without and with anamorphics aspect ratio comparison*

After my initial readings I learned that anamorphic lenses squeeze the image before it reaches the sensor/film. Its horizontal correct measurement is determined by the image's default width multiplied by a stretch factor (which may vary from lens to lens). You do not discard parts of your frame but the opposite: you add to it! You bring in elements that would fall outside of a spherical lens' angle of view.


anamorphic
block
50mm
spherical
50mm
anamorphic

Since 2012 I read countless articles, threads, forums, posts, ebay auctions and even an ***e-book on the subject*** in order to better understand these lenses' inner workings. It is not all pretty and wonderful as it seems in the beginning but they achieve a great deal of what I was hoping for. There are various complications and quirks but nothing that is impossible to merge into film-set routine.

When I reached out for other anamorphic users in Brazil I did not find anyone, just a bunch of curious people like me. With the internet's connecting power I went virtually abroad and started researching and experimenting. During this process, way over twenty different anamorphic lenses went through my inspection and analysis.

This series of experiments were followed by ongoing posts on ***my personal blog*** aiming to introduce the subject in Portuguese. I was obsessed with these lenses and had to share my findings with whoever was interested. This feeling was particularly strong because I had a ton of questions in the beginning and could not find answers until I had the lenses in my hands, looking through the camera. I wanted to spare other people from that stress.

Research has been an amazing experience. During this process I sold all my spherical modern glass, keeping only vintage Russian lenses and anamorphics. I have no plan to leave them, I crossed the point of no return.

My main goal with this project is to share as much as I can of all my discoveries and tests with these unique and rare lenses, be it in terms of origins and history as well as practical use in real shoots.

I mean, amazing CinemaScope pictures in a camera that costs less than US$4k, when could I dream of this?

***Author's note: Plenty of cameras these days qualify for that price range and we have a much broader variety in new anamorphic offerings! Things have definitely improved since 2012.***

# II – INTRODUCTION

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What are these so called “anamorphics”?
The formal definition:

> **“Anamorphic; Producing, relating to, or marked by intentional distortion (as by unequal magnification along perpendicular axes) of an image.” - *Merriam-Webster Dictionary*.**

In our case, a lens or adapter that distorts only the image’s horizontal axis. This is called “stretch factor”. Each lens has its own and it ranges between 1.33x, 1.5x and 2x. That means the resulting image will be horizontally squeezed and in order to bring it back to normal proportion you need to unsqueeze (or stretch) it following these ratios. A different name for stretch would be pixel aspect ratio: a virtual number that defines the width of each single pixel when displayed (instead of the standard 1×1 Square ratio).

What is the point of having something that looks totally weird in camera and needs to be post-processed so it looks right? Anamorphic lenses were brought into cinema around 1950 when Twentieth Century Fox bought a patent for Henri Chrètien’s (a French scientist) system of bent lenses developed for astronomical research.

Years earlier, the film industry reached the conclusion that wider images are more appealing to human eyes. There was already a process to achieve such results. It was called Cinerama: movies were shot with three simultaneous cameras and showed in a similar setup with three projectors and a curved screen that was way bigger than the current standards. The downside was triplicating the use of celuloid for each movie during production and even larger amounts during distribution. That made Cinerama not as profitable as desired. But the audiences loved the wide screen aspect of it.

Around the same decade three different methods of anamorphosis competed in the film industry. The first one was based off prisms, developed and used by Panavision, the second was achieved through the use of bent mirrors by Technirama and the third one is our all-time favorite, cylindrical lenses that compress the captured image, originating the famous – and desired – CinemaScope. In numbers CinemaScope means 2.4:1 aspect ratio: for each height measurement, there is a 2.4x measurement in width.

*Celuloid frame and different methods for a widescreen image.*
*Letterbox on top and anamorphic on the bottom.*

In Chrètien's design the image compression would be directly related to the glass' curvature. His anamorphic lenses were made up by two optical blocks. The front block was responsible for the anamorphosis and the rear block was a regular spherical lens. They were both put together inside a single lens body. Simpler setups work the same way today (we will get to that) and you have to focus both spherical and anamorphic blocks separately.

From here on the spherical block will be referred as "taking lens". It is an important concept that will be used over and over.

Once the image is shot and squeezed onto the film roll – there was no digital intermediate back then! – another anamorphic lens was required for projecting the final motion picture in order to de-stretch the image onto the screen. These projection lenses are still out there, flooding eBay and every other online market. They are bulky, colorful and heavy. Another downside is their really distant minimum focus distance - since the screen and the projection booth is usually between 9 to 15m (27 to 45ft) apart.

Meanwhile the Cold War was going on and the USSR was also a major technological center. Across the world, other anamorphics were being made, Russian lenses manufactured by LOMO, the Soviet's main optical developer, responsible for all camera and movie gear in the country conglomerate.

These lenses were made solely for motion pictures and differently from the American/French design, anamorphic and spherical blocks were split by default. They could be connected through a simple bolt though, which synchronized focusing on both blocks, solving the issue of having to focus each lens individually. These were pretty strong builds and spread mainly across Asia. Just like Hollywood's  standard, LOMOs had a 2x stretch factor.

At the beginning of the 1960's, ISCO Optics of Göttingen, German manufacturer, hires the man behind LOMO's designs. Deliberately replicating his previous work with LOMO, ISCO releases a series of anamorphic lenses, the Iscoramas. These had a stretch of 1.5x – aimed at the "rich amateur photographers" niche. The series consisted of a front anamorphic block attached to a 50mm f/2.8 cheaper taking lens (with Exakta, Minolta, Nikon F or Praktica M42 mounts). Image quality matched the market: sharp from center to corner.


*The Original Iscorama – 1.5x stretch*

In the 1980's Iscorama users found out it was possible to split both parts of the lens and use the anamorphic block paired to other taking lenses. ISCO takes advantage of this practice to release updated versions of their products getting rid of third-party manufacturers by discarding the 50mm taking lens and selling just the anamorphics. Those are the incredibly famous Iscoramas 36, 42 and 54.

The optical engineer behind these lenses used a design based on variable diopters. In this scenario the taking lens is focused to infinity and all the focusing is done on the Iscorama. By registering this patent, ISCO Optics of Göttingen killed any other manufacturer's dream of replicating its solution. This caused a drastic loss in terms of similar workarounds until recent times, making Iscoramas a unique species.

Quick recap: based on the need of creating wider-looking images while trying to NOT scrap every motion picture camera currently in use, scientists develop anamorphic lenses that attach on top of regular spherical lenses and compress their images. Russians are not far behind and develop their own anamorphics. Germans take the Russians' formula and improve it, releasing the Iscoramas which hold the single-focus patent.

Following these events, Japanese companies start making their own anamorphic elements (Kowa and Sankor) with a 2x stretch, and even Henri Chrètien, through Societe Technique Optique de Precision puts out some lenses for cameras and projectors, the Hypergonars S.T.O.P.

The market keeps evolving and while some of these lenses were pretty good with 8mm and 16mm film, with the change from film to video and later to all-digital formats, amateur anamorphics are less and less useful. They end up forgotten at the bottom of "used gear" boxes. Videocamera's lenses are not interchangeable and stills photographers were never too fond of the squeezed images. Around 2008 most of these anamorphic gems could be found on eBay for less than US$200.

The last additions to the anamorphics list came out after mini-DV cameras became popular. These are fixed focus adapters and their name comes from the fact that they lack a focus ring, featuring a simple screw for alignment – so the stretch is applied on the correct axis. Focusing is done on the taking lens, attached to the camera and it has its own limitations (more in ***IIIA - FIXED FOCUS (1.33x)***).

At the top of its game, Panasonic's DVX100 – the camera responsible for empowering the indie filmmaker – got its own anamorphic adapter, the Panasonic AG-LA7200, with much greater size and quality than its generic competitors.

The goal of these adapters however is not to achieve CinemaScope aspect ratio. Most mini-DV cameras (even the DVX100) shot 4:3 aspect ratio pictures, which was the default TV ratio at the time. These adapters came out to allow older cameras to shoot in the new and widescreen 16:9 "modern" proportion. This is much like what happened in the the film industry: it is cheaper to buy an adapter than a new camera. Unfortunately these were not a big hit because they were already pretty expensive and not many people were willing to pay the extra buck. They were also discontinued and forgotten.

We arrive at 2009 and all these lenses can be found on eBay for laughably low prices. The The Canon 5D MkII came out in the previous year and it is revolutionizing digital video's world. At that point a curious dude or gal, like you and I, decided to check if these old, weird and (at that moment) cheap lenses were compatible with DSLRs' video capabilities.

I can only imagine their surprise when the thing worked and, not only that, the resulting image was amazingly wide and unique. Results came online and more people got curious. Among these it is easy to name Andrew Reid – responsible for EOSHD and author of the guide that inspired my research -, Edwin Lee – famous for being a pioneer in anamorphics and DSLRs – and Alan Doyle, also known as ***Redstan*** – a great source of knowledge about motion picture anamorphic lenses.

Shortly after processing the boost in width, these new anamorphic users realized a couple other features inherent to those lenses that were hard to achieve when not using them. These features had a lot to do with the resulting images' cinematic feel. The first of these features was the different bokeh or out-of-focus highlights, which remained oval even after unsqueezing. With spherical lenses bokeh has always more of a circular shape.

Another unique feature that quickly drove anamorphics up in popularity was the anamorphic lens flare. Lens flares are not always bad, especially if used while developing a unique look. Anamorphic flares are long, streaked and (popularly) blue. They are totally different from spherical flares and have a lot of personality. Using J.J. Abrams as a reference (easy one, I know), anamorphic flares are a constant through his work and we can easily spot his signature over a couple brief seconds in most of his movies.

From these various tests, reviews and experiments published on YouTube, Vimeo, EOSHD and other online forums, many other shooters got interested in the game. So began the rush for anamorphic glass worldwide. In less then a year, Iscoramas that went for US$200 now reached US$4000 on eBay auctions. Many other lenses also sold for crazy-high prices.

Following this raise in value many anamorphic owners decided to sell their beat up old lenses, increasing the availability and lowering overall sales prices. Now,

a couple years after the initial outbreak, an Iscorama goes for about US$2500 on auctions.

LOMOs' prices are widely apart since many of them already have cinema mounts and quality standards, so they can easily go over US$4000, but it is important to keep in mind that these were never cheap and we are brought into the DSLR world through the use of adapters. I will not write about fixed focus adapters and projection lenses because their prices do not seem to follow as strict rules as the most popular Iscoramas and LOMOs.

Over the last months the anamorphic community rejoiced with announcements of brand new lens designs and releases to come soon. Among them we have SLR Magic – Hong Kong based – and Letus35 – in the US. Both promise 1.33x stretch and fixed focus adapters with controls for situations such as close up shots. Price expectations range between US$800 and US$1300.

## III - LENS RESEARCH

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After the first few weeks of research, reading, watching tons of test videos and getting to the core of the anamorphic squeeze's pros and cons, I still had plenty of questions unanswered. My curiosity got the best of me so I decided it was time to invest in buying lenses. My starting point was Reid's ***Anamorphic Shooter's Guide***, from there I went on refining my decisions and ended up buying four lenses, all of them quite different from each other. Their differences will be better explained along the following chapters. They were Kowa for Bell & Howell, Panasonic AG-LA7200, Hypergonar Hi-Fi 2 and a 50mm LOMO Squarefront.

Experienced shooters reinforced that I should use simpler taking lenses with less coatings to make flares pop. This meant no modern glass, no Canon L series, no zoom lenses. I ended up choosing vintage primes from 1970-80 and was pretty happy with Russian-designed M42 mount all manual (focus and aperture) lenses.

The kit included a 37mm f/2.8 (Mir-1B), 58mm f/2 (Helios 44), 85mm f/2.8 (Jupiter 9) and 135mm f/2.8 (Tair 11A). With these lenses I covered the standard focal lenghts in a basic prime kit and could work out my framing and composition with enough freedom to survive a shoot.

To bring out the anamorphic looks, it is good to pair scopes with vintage, pre-1970's, taking lenses, years before the development of multi-coating (MC). Multi-coating is a physical process of adding very thin layers of chemical

components that protect modern lenses from glass damage, reduce flaring effects and increase light transmission. This means that lenses made before this thing was invented are non-coated or single coated. That relates greatly to anamorphic's more proeminent feature: lens flares.

I picked mine in M42 mount out of personal taste but there are plenty of other mounts that can be easily adapted to Canon EF. Even though adapters are quite common, before buying any lens be sure to check if it works properly with the camera you are using. A simple search is good enough to save you from a headache involving flange distance and things being out of focus when they should be sharp. This also helps you to choose exactly which model you want and what features you wish to accentuate on your work. There are countless makes of 50mm around, which one suits you best?

There was still an important question unanswered: how to properly connect both anamorphic block in front and the taking lens behind it? LOMOs aside, all anamorphics can be considered adapters you add to the taking lens. They operate as a filter that you screw on the threads and deliver a very specific result.

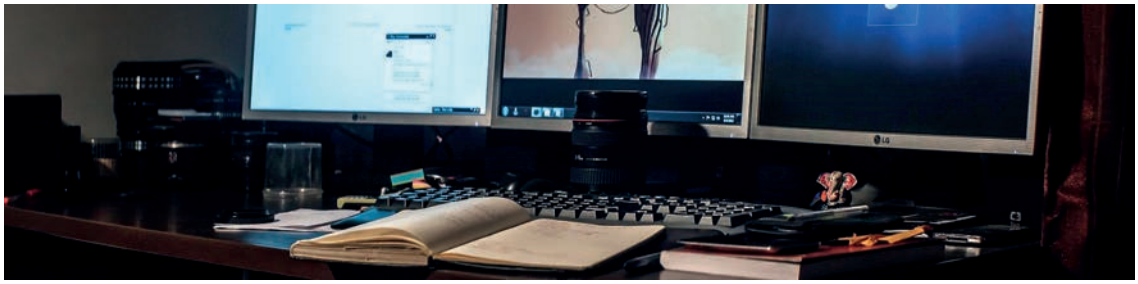
In the very beginning of my searches I came across lots of posts stating that for a safe setup you should use clamps to connect both lenses. Clamps are metal rings that attach to the back of the anamorphic adapter - mostly using screws - and feature regular filter threads to screw onto your taking lens. This allows the closest possible distance between the two optics which saves us from the trouble of light loss when working with anamorphic adapters (usually the loss is so small it does not cost you even a third of a stop).

*Redstan Clamp for Kowa Bell & Howell, 62mm threads*

Many anamorphic adapters have threads on their backs already but these are not standard sizes and we usually end up with sizes that are not used nowadays.

Clamps serve to fix this issue as well as to deal with stretch alignment. You can loosen the screws without the adapter toppling over and rotate the anamorphic block so the stretch is properly aligned with the horizontal axis of the sensor. Screwing an anamorphic onto a taking lens and having it skewed in the camera is the first thing that happens when you switch lenses. It is fundamental to align scopes properly otherwise the final image will be irreversibly skewed. Check the pictures below for examples!

*Misaligned anamorphic block*



*Aligned anamorphic block*

The main advantage of getting a clamp made specifically for a lens model is that they fit like a glove, it feels solid and it makes for super easy alignment. There are very few manufacturers and a LOT of improvised workarounds. Redstan, in the UK, is quite famous for his specially-designed clamps of the most common lenses. ***Vid-Atlantic*** is an american company with cheaper options if you do not want to spend too much money on a piece of metal. Redstan's quality is unbeatable, but he is usually out of stock because the clamps take a while to cut and people are always buying them.

*Author's note: Since 2015 we have had **Rapido Technology** offer clamps and support systems for plenty of lenses, as well as **RAF Camera** for specific projects and smaller runs.*

As I said in the beginning of this chapter, each one of my lenses worked differently from the others. They had different stretches, image quality and years of manufacture. I will split them according to stretch factor because it is the easiest way to group and differentiate them.