Anamorphic Lenses, VariScope and E-VariScope – Which Method Is Right For You?

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October 10, 2014

I often field questions about anamorphic imaging methodologies, and especially how Wolf Cinema projectors fire on constant height, 2.35:1 "CinemaScope™" screens. We all despise the top/bottom "black bars" as embedded in our various media providers [broadcast, Blu-ray, DVD, streaming]. Getting rid of those unwanted black bars – however you do it – is a great experience for the home theater enthusiast, and we at Wolf Cinema wholeheartedly encourage the sale and installation of CinemaScope-type screens and matching projectors, by whichever methodology you chose to deploy.

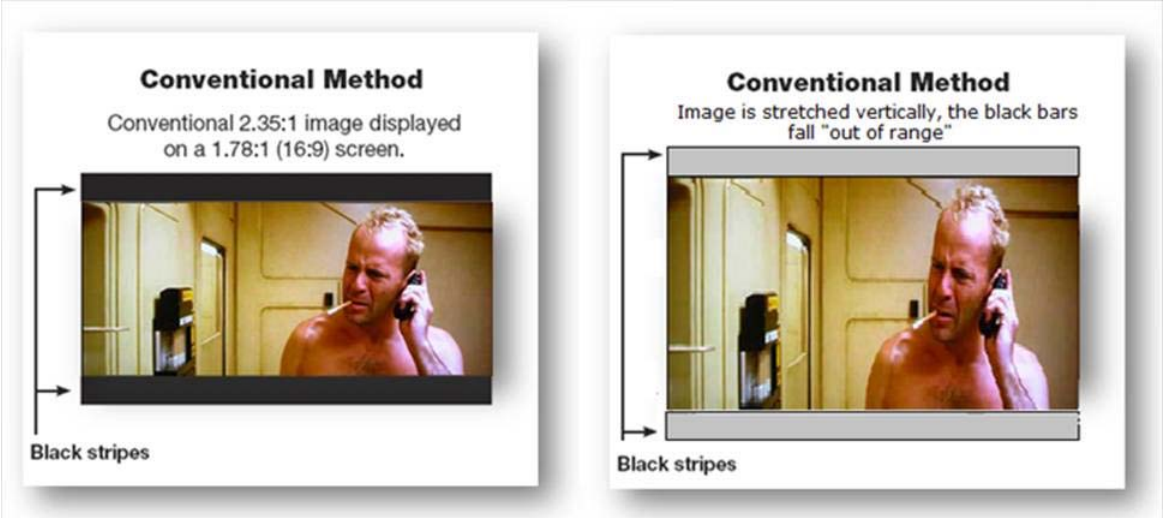
There are three ways we do "anamorphic" – (1) using a high-quality outboard anamorphic lens [Panamorph, Schneider ISCO, Xeit etc], (2) using the onboard lens focus/zoom memory system called VariScope™ [included in the SDC-8/10/12/15 and REF series], and (3) E-VariScope™, a technology feature included in our outboard ProScalers, and all projection ensembles bundled with a ProScaler.

Below are some visuals from a training deck to help further explain these three 'CinemaScope' firing methods:

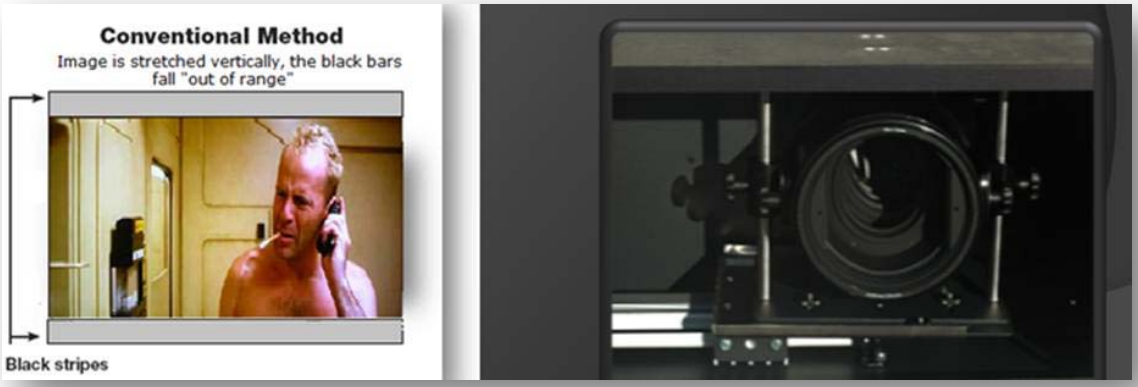
1/ Anamorphic lens. The most important point to remember: ***the 2.35:1 content is ALWAYS presented at 1920 vertical columns x approximately 810 horizontal lines***. This is a result of the 'Scope material ALWAYS being provided within a 16/9 delivery image frame. When using an outboard anamorphic lens the image must first be "stretched" [scaled/processed] in the vertical direction. The top/bottom black bars fall off the chip set. That is the primary advantage here – no black bars and no possible dark image "halo" above/below the screen when watching content – but there is the added cost and complexity of such installations. Another slight advantage here is the use of the complete chip set, providing appx. 20% more net peak white performance.

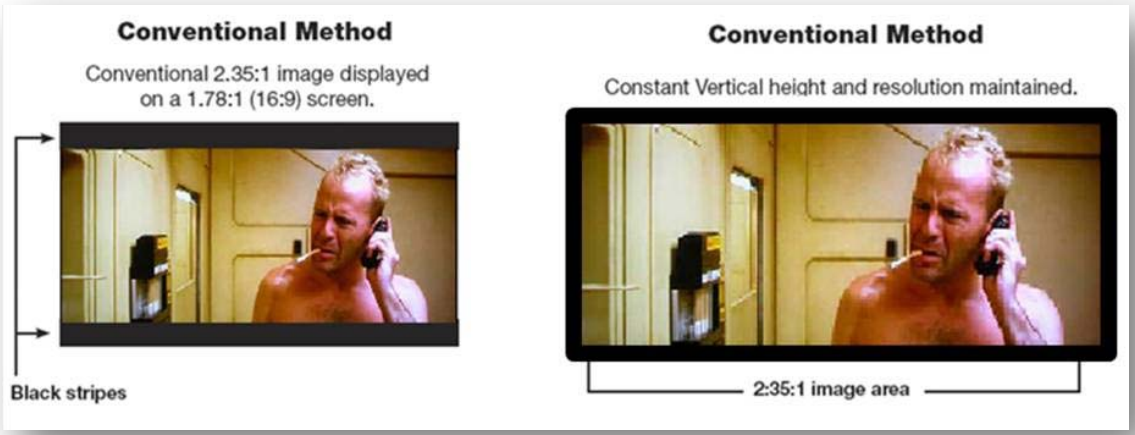
Some have referred to this method as providing for increased resolution ["you're using the full chip set, right?"], which is an erroneous assumption – the content resolution **STARTED AT**, and **ALWAYS REMAINS** at 1920 x ~810 [the remaining lines being the 'black bars'], and as such the end resolution can never be greater than that. The remapping of that content to the full chip set can also result in numerous processing artifacts: time base errors, aliasing errors, increased dithering and/or mosquito noise… all as a result of stretching the original image. You can never get back to "pixel for pixel" performance. But this is a very popular method and one we also fully endorse: all Wolf Cinema projectors and processors will support any external anamorphic lens assembly.

In this method the image must be first stretched vertically:

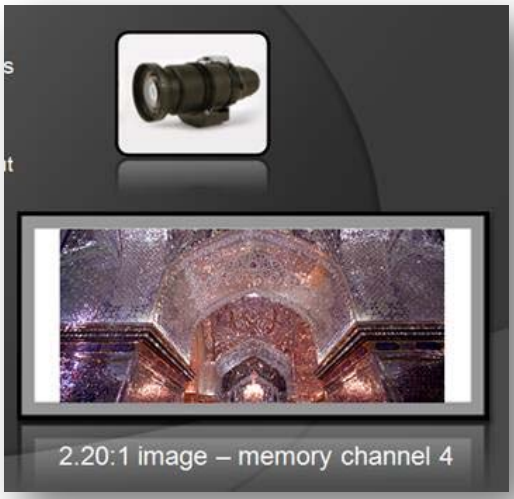


From there, the anamorphic lens is deployed [in either fixed or on the moving sled] and restores the geometry:





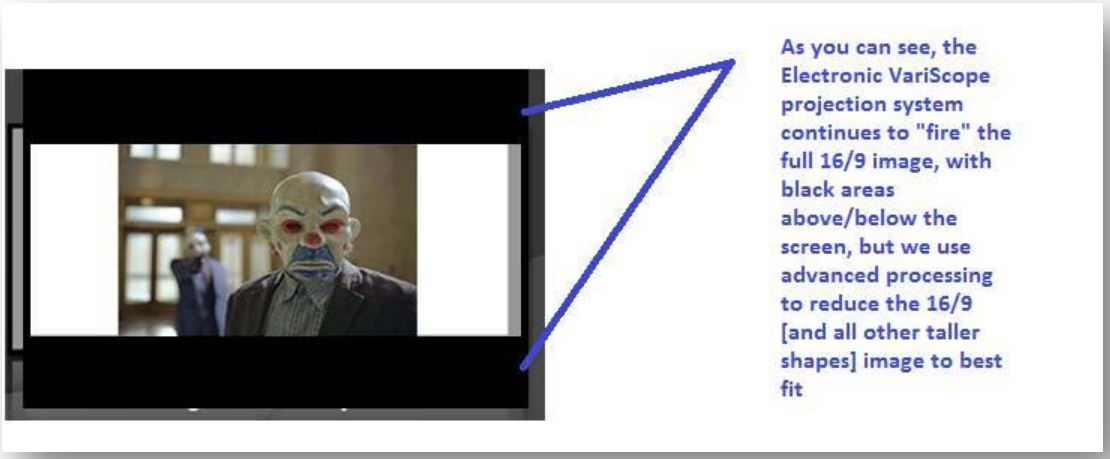
2/ VariScope™ "lens memories" or lens indexing. Here, the image is simply "zoomed out" so that the 2.35:1 content properly fills the full screen width; correspondingly the image is "zoomed in or down" to reduce the taller 16/9 content, in order to best fit the constant height screen. Pixels get slightly larger when watching 'Scope content, slightly smaller when returning to 16/9.



Note that those "black bars" above/below the 2.35 content are still being fired above/below the screen. Use care in wall treatments behind the screen, and handled correctly one will not see those ~7.5 IRE black bars. Some feel this is the "purist" solution in that there never is any video processing or scaling involved – just slightly different pixel sizes. However the original content may be presented, that original content is seen in its entirety. Minimal scaling artifacts are the optimal end result here. One drawback is "time" in that it takes upwards of 30 seconds to zoom in or out, and return to a pre-set memory.

3/ E-VariScope™, or Electronic VariScope. We position the projector at its native optical throw distance so that you are filling the maximum width of the 2.35:1 screen. Somewhat similar to our zoom/lens memory method above (#2), we begin with the 16/9 black bars "overshooting" the top and bottom of the screen. The inner 2.35 content remains visible on screen.

Then the ProScaler electronically remaps [reduces in resolution] **ALL** other **SMALLER WIDTH** aspect ratios, to fit the constant height screen. The original black bars are still active and "live", but we are using very good processing to reduce all the other taller aspect ratios. You end up with a 16/9 image in the approximate resolution of 1440 x 810 lines, aka something akin to 720p. Interesting that the pixel size remains the same and the human eye typically cannot discern any noticeable difference in image quality. The benefits here are again, it is "free" in those projection systems that come with our outboard ProScalers, or available in a ProScaler add-on. All 2.35:1 'Scope content is seen in its native, purist forms. All 16/9, 1.85, 2.20 images etc are electronically remapped to fit and still provides for great imaging quality. A final benefit is that the switching is instantaneous, without any noticeable delay in shifting from one aspect ratio to another.



So the major drawbacks to #2 and #3 include the possibility of slight “haloing” or “dark gray image” flare above and below the screen… since the black bars are still being fired. For many clients that is a more than acceptable tradeoff, since these solutions are often free [provided with the system, and when no external anamorphic lens is in use]. Treat the walls above/below the screen appropriately and this is rarely a problem.

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