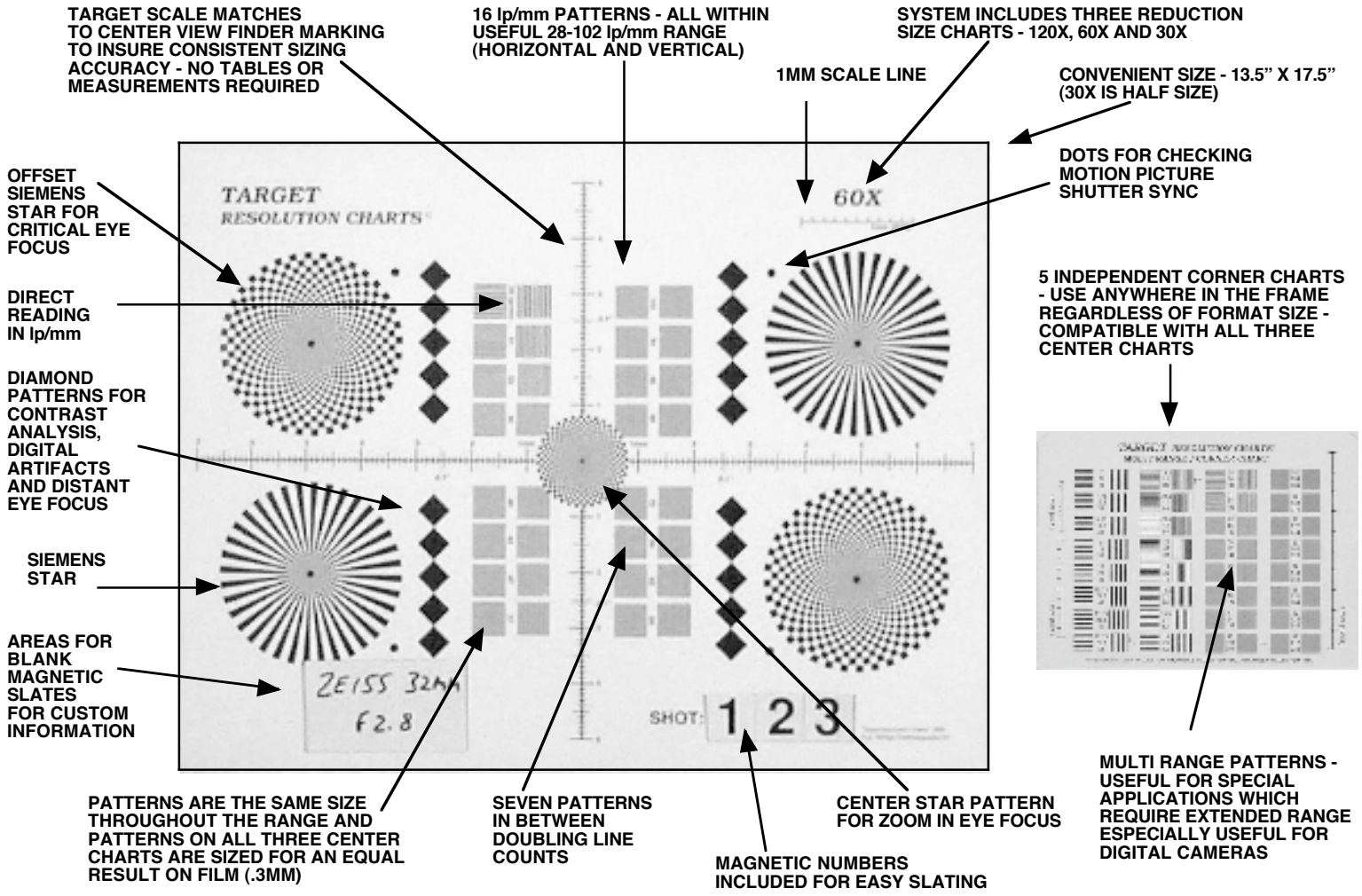
TARGET RESOLUTION CHARTS ©

A CONVENIENT AND ACCURATE SYSTEM FOR DETERMINING PHOTOGRAPHIC AND DIGITAL RESOLUTION

NO MEASURING, FORMULAS OR TABLES*



***Target Charts were designed for use with motion picture lens testing. They use an innovative direct measurement system which utilizes center markings in photographic film and still cameras with reflex viewfinders to maintain consistent pattern sizing.**

BUT NOW TARGET CHARTS HAVE GONE DIGITAL!!

The Target manual has been updated to include digital still camera testing which includes adding LW/PH evaluation to the existing lp/mm system. Now Target charts are a perfect way to test and compare film and digital imagery!

Target has some major advantages to add to digital testing:

- REASONABLE DISTANCES - NOT TOO CLOSE
- NO MINIMUM FOCUS PROBLEMS
- HIGH VALUE, EXTENDED RANGE
- FINEST PATTERN VERY DISTINCT
- 3 REDUCTION SIZES - LARGE AND SMALL CHARTS
- EASY TO ANALYZE PATTERNS - ALL THE SAME SIZE
- MORE INBETWEEN PATTERNS
- EXTRA CORNER CHARTS

The direct measurement system does not apply to most digital cameras. The Target instruction manual explains proper sizing methods and how to convert photographic lp/mm to LW/PH results, more commonly used with digital and video resolution testing. This brochure is intended for this new digital use and will explain this new application in detail. For more information on film applications, ask for that brochure.

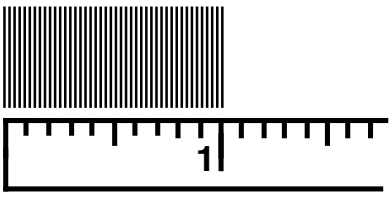
MORE ON THE TARGET WEBSITE - www.stringercam.com/target.html

TWO RESOLUTION SYSTEMS:

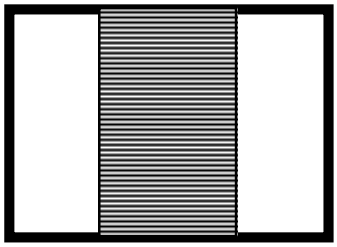
Resolution is determined by the finest number of pattern lines you can see clearly in the final picture. Target charts were originally designed for lp/mm results. This is a standard motion picture and professional photographic still testing method that tests how a lens resolves line patterns on film. This system does not distinguish between large and smaller formats, but isolates the performance of the lens and the film or image medium. You can use this system with digital stills but it is more difficult to get an accurate measurement of the final image to confirm the reduction sizing. To analyze lp/mm results, you have to look at the film negative with a magnifier, or in digital stills, blow up the results on a computer. This allows you to see when the line patterns become fuzzy or lose their resolution.

Video style charts give results in the number of lines of horizontal resolution in the frame and is abbreviated as LW/PH. Not only do video chart results evaluate the performance of the lens and the image medium, but they combine these with the effect that the format size has on the overall picture resolution. Results are evaluated in video by looking at the results on the TV screen or measuring with electronic scopes, but when testing film or digital stills, they can be evaluated by blowing up the image.

Which system is best? Well, they were designed for different purposes and different technologies. Both resolution systems start with line patterns on a chart. The difference is in the values given to the pattern sizes, the way the patterns are sized in the frame, and the interpretation of the results.



lp/mm is actual measurement of the image



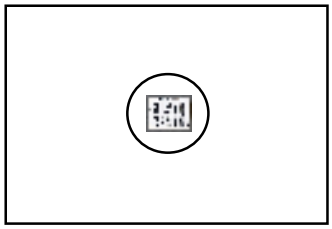
LW/PH is the # of lines that fit in a format frame

In digital cameras, the quality difference between pixel count and CCD size is complex, so the LW/PH system is a good way to compare the overall results from different cameras, regardless of megapixel specifications. Many digital camera internet reviews use LW/PH results to compare cameras. Using Target charts, LW/PH results are a very effective way to compare photographic film formats versus digital formats, because the chart will work with both image mediums. Some video LW/PH charts are not very big and when used in testing small chip cameras, the required distances are (unrealistically) too close to the chart. The Target charts have much more field of view and offers a choice of reduction sizing, so cameras can be tested at more realistic distances.

HOW TO USE TARGET RESOLUTION CHARTS FOR LW/PH RESULTS

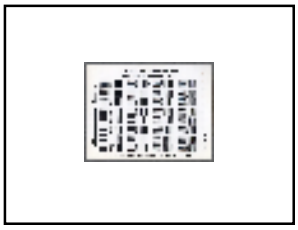
The method of adapting Target Charts for LW/PH results involves a simple calculation after the proper sizing (120x, 60x, or 30x) has been determined according to information in the Target manual. You should start by lining up your sizing with the 60x chart to determine if you are working at a convenient distance. If you're too close, which might be case with smaller digital chips, switch to the 120x chart, if you're too far away, use the 30x chart. There are 5 multi range "corner" charts included in the kit, which were made as an additional aid for motion picture testing, but can be used as the main chart for digital because of their smaller size and the extended, wider range of patterns. They include pattern values which can interpolated for each of the three reduction factors (120x, 60x, and 30x). You can also combine corner charts with the larger charts.

Follow all instructions in the Target manual that relate to your format. Let's say you use a 60x sizing with the smaller corner chart with a 35mm film camera and a 120x sizing with a 1/2.7" chip digital camera. You can use different reduction sizing, depending on convenient distances with each camera - the results are still comparable. You size up the image by marking off an enlarged outline of the actual format or chip size with tape on a wall and then line this up in your viewfinder. You can choose whatever focal length lens you want to use (the distances will change based on image line up). The images of the chart might be different sizes in the frame with the 35mm camera and the digital camera, but this keeps the size of the lines comparable (see diagram top of next page). You can use extra corner charts if you want to check corner resolution or tilt a chart to get more critical results (some LW/PH charts add a 5% tilt to pattern lines).



24mm

35MM FRAME WITH 60X SIZING NORMAL LENS - DISTANCE FROM CHART 10 FEET



4mm

DIGITAL CAMERA WITH 120X SIZING NORMAL LENS - DISTANCE FROM CHART 4 FEET

When you evaluate the patterns by magnification of film or digital image, you have two choices of interpretation. For lp/mm results, the Target patterns are pre-marked and ready to pick the best resolved pattern value. But LW/PH is a different system - it is based on the finest number of single lines that will fit in a format frame - top to bottom. So, first we have to find the single line width values for each of the patterns. There is a conversion table in the Target manual which provides these translated values.

To get LW/PH values, you simply divide the format height by the single line width in the table which corresponds to the pattern which is best resolved. If the best pattern resolved from the 35mm camera is indicated as 47 lp/mm (by examining the neg), that is the actual lp/mm result, but for LW/PH, divide the format height in mm (which is 24mm) by the single line width for that pattern which is .01064 (from the Target manual table). That's 24/.01064 which equals 2255 LW/PH. If, when examining the computer image, the best resolved pattern with the 4mm high 1/2.7 sensor is indicated by the 102 lp/mm pattern (.00490 line width from the table), that would calculate as 4/.00490 = only 816 LW/PH. Now you can see the effect of the larger format, which gives better results in LW/PH. The evaluation of the computer images, arriving at a 120 lp/mm result is shown below. The Target manual explains this process in detail - step by step.

THIS SHOWS EXAMPLES OF TARGET CHARTS RESULTS FROM COMPUTER BLOW UPS

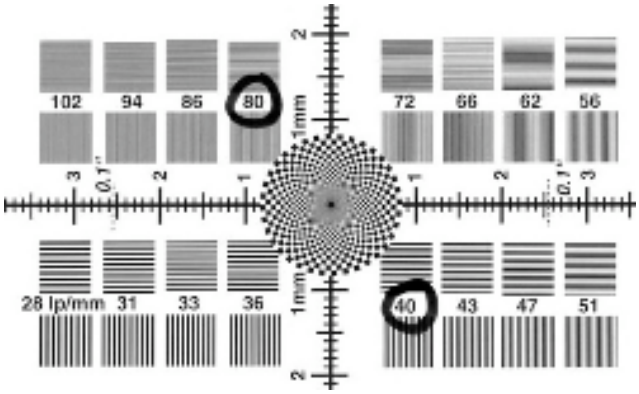
HERE THE ARE NO SENSE OF HORIZONTAL OR VERTICAL LINES AT ALL - THIS IS EXTINCTION RESOLUTION

5 STEPS DOWN FROM EXTINCTION RESOLUTION IS THE POINT OF ABSOLUTE RESOLUTION (BEST REALISTICALLY RESOLVED PATTERN) IN THIS CASE THE 120X REDUCTION RESULT IS 102 LP/MM

7 STEPS FROM EXTINCTION RESOLUTION THE LINES ARE EVEN MORE CLEAR (86 LP/MM)

OTHER ADVANTAGES AND SUPERIOR FEATURES OF THE TARGET SYSTEM

- MORE IN-BETWEEN PATTERNS - This section of a large Target chart shows there are seven in-between patterns within a doubling progression from 40 to 80. This gives many more choices to work with and therefore you can pinpoint a higher, more specific value than existing systems.



- FINER, SAME SIZE PATTERNS - By going up to a very fine 102 lp/mm pattern, Target Charts cater to modern high resolution lenses and films. Unlike other systems where the patterns get smaller as the lp/mm get higher, Target patterns are rendered the same size for easy comparison. The corner charts have even finer patterns (to 408 lp/mm!) which is great for digital analysis.

- RANGE OF PATTERN SIZES - Some existing systems try to cater to more than one reduction factor by using the same chart over different distances with tables to interpolate the results. Therefore the chart displays a wide range of patterns which might includes some patterns which are too course or too fine. Target offer three choices of sizing - 120x, 60x, and 30x. This covers a wide variety of focal lengths and formats, and still keeps within practical distances. The 60x is for mid-range, the 120x for wide lenses, and the 30x for telephoto lenses.

- FIVE CORNER CHARTS - The corner charts are designed to be independent from the center chart, so can be used anywhere in the frame. They display an extended multi-range of lp/mm patterns, so not only do they work with all three chart reduction factors (120x, 60x, 30x), but they can be used for special applications where a wide range of patterns is required. These small charts are useful for digital stills because of the smaller image sizes required and the need for extended scale evaluation, because resolution fall-off is more difficult to visualize in digital.

- SLATING AIDS - There are built in slating areas which use magnetic squares and paper-thin strips of metal (on the back of the charts). Numbers are included to post slates from 1 to 199. Two blank custom slates are included to post additional information with an erasable marker. This system is quick, easy to use and the chart surface is kept clean and free from damage.

- OPTIMUM PRINTING STANDARDS AND CONVENIENT SIZE - The line pairs are printed black on white with excellent fine line detail quality. The dull matte surface reduces flare and is also resistant to tape damage. The largest charts are 13.5" x 17.5" and can be shipped and stored in a 14" x 18" envelope.

- OTHER FEATURES - Each center chart has four Siemens star targets (two regular, two offset) to help eye focus and offer immediate lens evaluation. There is also a small star target at the chart center for eye focus when zooming in. Diamond patterns offer contrast assessment as well as distant eye focus points.

- MANUAL - Includes comprehensive 20 page instruction manual with detailed procedures for both lp/mm and LW/PH results, helpful hints and background information on resolution evaluation.

The Target Resolution Chart kit includes:
- Three large charts (120x, 60x, and 30x)
- Five corner charts
- 22 magnetic numbers and two blank slates with water soluble marker
- 10mm Measurement scale
- 20 page instruction manual.