prefilter for reasons mentioned above, and therefore introduces very little aliasing of its own, thereby taking from the first signal response **503** that low frequency portion that has minimum aliases. The final response **515** can be extremely flat within the passband allowed by the spacing of pixels in the final chosen output C resolution **507**, giving excellent image sharpness, while the residual aliases **517** remain very low at all important frequencies, giving a smoothness to the image. Combined, the image is described by observers as looking "clear", and can produce equivalent clarity with far fewer pixels than in a prior art system that samples by physically placing the sensor elements at the locations of the final chosen output resolution pixels.

In summary, this invention achieves image clarity by physically oversampling the object to be scanned. This oversampling pushes aliases out to very high frequencies. The resolution is then reduced with digital filtering in a way that preserves both flat frequency response and low aliasing. This digital filtering is made practical using a two filter process. The first step makes a rough cut to bring the response close to final resolution. The second step makes a precision cut by trimming the edges of the rough cut image.

While the invention has been shown and described with reference to particular embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and detail may be made therein without departing from the spirit and scope of the invention.

I claim:

1. An apparatus for resizing a first image contained in a first array of digital pixels of a first sampling frequency to a second image contained in a second array of digital pixels of a second sampling frequency, comprising:

means for receiving the first array of digital pixels;

a sinc digital filter for converting digital pixel values contained in the first array of digital pixels wherein the first digital pixel values are linearly representative of the brightness of light of the image as it is intended to be finally displayed to digital pixel values stored in the second array of digital pixels; and

means for outputting from the resizing apparatus the digital pixel values contained in pixels of the second array.

2. The apparatus as recited in claim **1** wherein the output means further comprises means to output digital pixel values corresponding to a generally square root function of the digital pixel values stored in corresponding pixels of the second array of digital pixels.

3. The apparatus as recited in claim **1** wherein the receiving means receives digital pixel values bearing a generally square root function to the brightness of light of the image as it is intended to be finally displayed.

4. The apparatus as recited in claim **3** wherein the sinc digital filter produces the second array of digital pixels from numbers corresponding to generally the square function of the digital pixel values contained in the first array of digital pixels.

5. The apparatus as recited in claim **4** wherein the first and second digital array of pixels, and an intermediate array of digital pixels contain mutually perpendicular rows and columns of pixels, and wherein the sinc digital filter further comprises means for converting the digital pixel values contained in a column of pixels of the first array of digital pixels to digital pixel values that are stored in a column of pixels of an intermediate array of digital pixels.

6. The apparatus as recited in claim **5** wherein the sinc digital filter further comprises means for converting the digital pixel values contained in a row of pixels of the intermediate array of digital pixels to digital pixel values that are stored in a row of pixels of the second array of digital pixels.

7. A method for resizing a first image contained in a first array of digital pixels of a first sampling frequency to a second image contained in a second array of digital pixels of a second sampling frequency, comprising the steps of:

receiving the first array of digital pixels;

converting digital pixel values contained in the first array of digital pixels wherein the first digital pixel values are linearly representative of the brightness of light of the image as it is intended to be finally displayed to digital pixel values stored in the second array of digital pixels; and

outputting from the resizing apparatus the digital pixel values contained in pixels of the second array.

8. The method as recited in claim **7** wherein the first and second digital array of pixels, and an intermediate array of digital pixels contain mutually perpendicular rows and columns of pixels, and wherein the method further comprises the step of converting the digital pixel values contained in a column of pixels of the first array of digital pixels to digital pixel values that are stored in a column of pixels of an intermediate array of digital pixels.

9. The method as recited in claim **8** which further comprises the step of converting the digital pixel values contained in a row of pixels of the intermediate array of digital pixels to digital pixel values that are stored in a row of pixels of the second array of digital pixels.

10. The method as recited in claim **7** wherein the second sampling frequency is lower than the first sampling frequency by an arbitrary ratio.

11. The method as recited in claim **7** further comprising the step of converting the first array of digital pixels to digital pixel values which are linearly representative of the brightness of light of the image it is intended to be finally displayed.

12. The method as recited in claim **7** further comprising the step of adding a portion of a first digital pixel value of the first array of digital pixels and subtracting a portion of a second digital pixel value of the second array of digital pixels for deriving a digital pixel value in the second array of digital pixels.

13. A computer product in a computer readable medium for resizing a first image contained in a first array of digital pixels of a first sampling frequency to a second image contained in a second array of digital pixels of a second sampling frequency, comprising:

means for receiving the first array of digital pixels;

means for converting digital pixel values contained in the first array of digital pixels wherein the first digital pixel values are linearly representative of the brightness of light of the image as it is intended to be finally displayed to digital pixel values stored in the second array of digital pixels; and

means for outputting from the resizing apparatus the digital pixel values contained in pixels of the second array.

14. The computer product as recited in claim **13** wherein the first and second digital array of pixels, and an intermediate array of digital pixels contain mutually perpendicular rows and columns of pixels, and wherein the method further comprises the step of converting the digital pixel values contained in a column of pixels of the first array of digital pixels to digital pixel values that are stored in a column of pixels of an intermediate array of digital pixels.