

## APPENDIX 1 : Effect of various screen frequencies

High screen frequencies accentuate xerographic problems, while very low screen frequencies tend to degrade image quality by removing high frequency information. The 256x256 8-bit sample image used on this page is from USC, and has become a standard in the image processing world.



no screen added



130 line screen added



65 line screen added



45 line screen added



30 line screen added



45 line 0 degree screen added

## APPENDIX 2 : Effect of various screen amplitudes

The lower the screen amplitude, the closer the print becomes to a print with no screen added. As the screen amplitude is increased, the high frequency content of the picture is smoothed out. (Note that sometimes this high frequency content is an artifact caused by repeating input sample values.) Changes in amplitude are most noticeable with a low screen frequency, so a 30 line screen has been used in this example. The image used here is a 64x64 sample area from the USC image on the previous page. Amplitude is measured in percent of dynamic range of the original image.



25% screen amplitude



50% screen amplitude



100% screen amplitude



200% screen amplitude

## Technical Note

The halftoning technique presented here provides an adequate facility for printing sampled images, but it is far from being optimal. Among the design considerations of the present implementation in the 3100 Press printing program were the requirements that the code be easily modifiable (to experiment with other techniques), and modular (to allow it to be used by other programmers for other purposes). At present, the halftoning is accomplished by a microcode routine which operates on one scan line at a time. It takes as input a vector containing: address of the matrix for the digital screen (or 0, if no screen), matrix size, error distribution vector (which is updated), address of samples, address for output bits, size of input samples, and information about sample scaling (the ratio of input samples to output bits).

The default values for screen frequency, amplitude, and angle are set when the program is installed. They are presently set for a 50 line 45 degree screen, with amplitude equal to 100% of the dynamic range of the image.