

Color Notes

The Basics of Color Notes

Rich & Associates Learning Series

Jim Rich

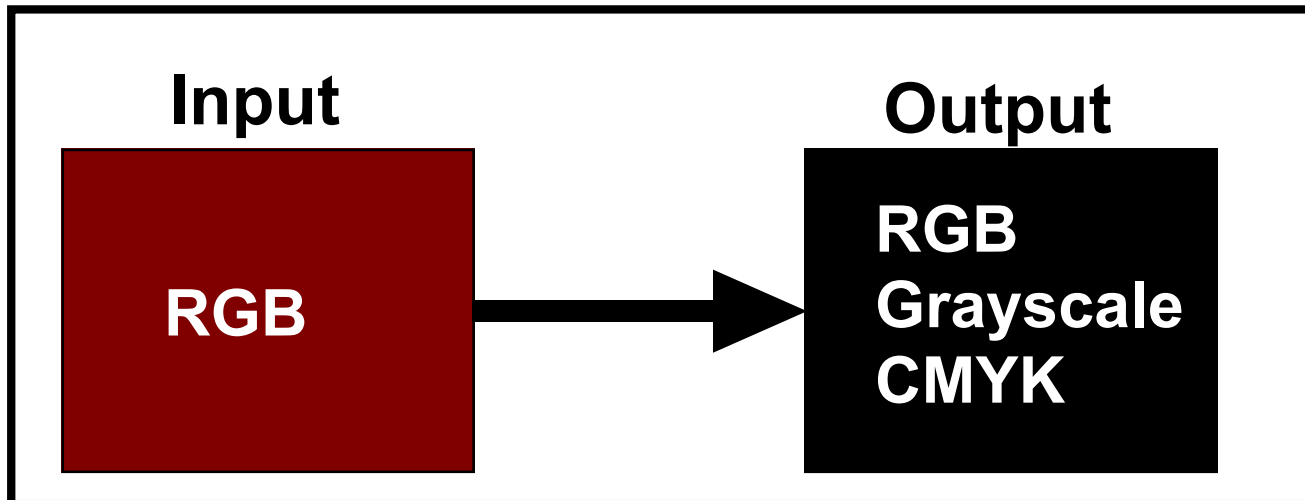
President

Rich & Associates, LLC

jim@jimrich.com

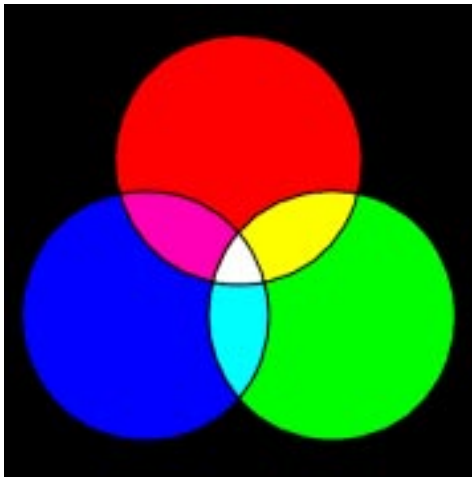
Color Spaces & Image Capture

- The most predominate color spaces used are:
 - Red, Green, Blue
 - Cyan, Magenta, Yellow, Black (K)



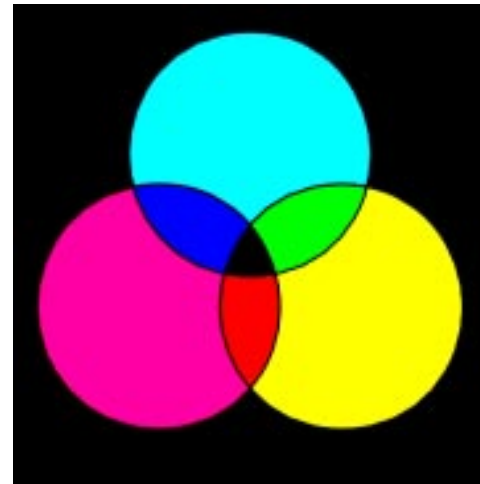
Color Theory

RGB



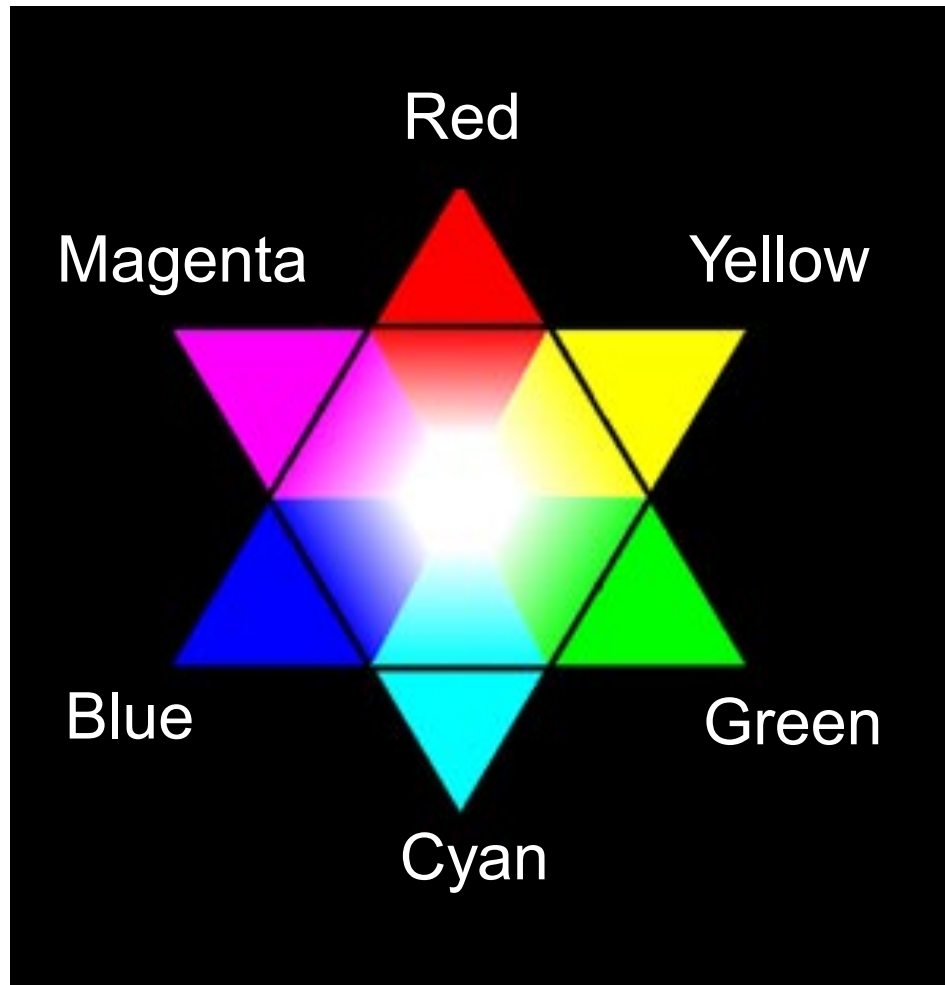
Additive

CMY

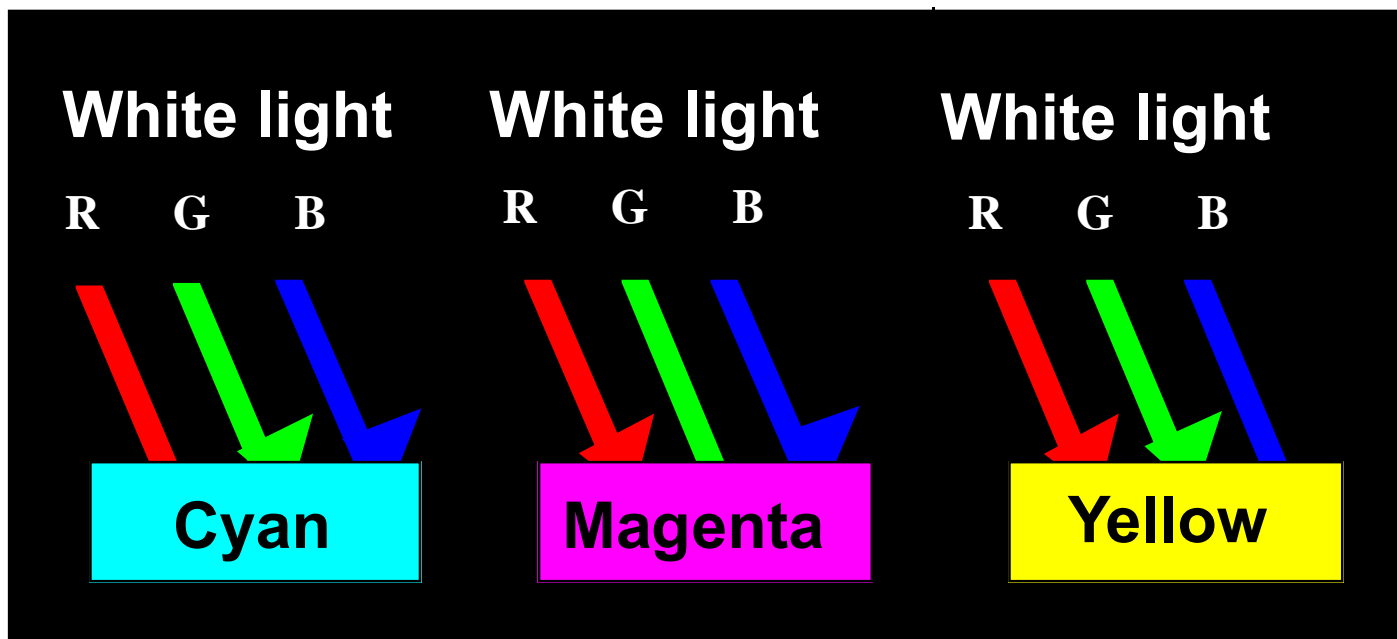


Subtractive

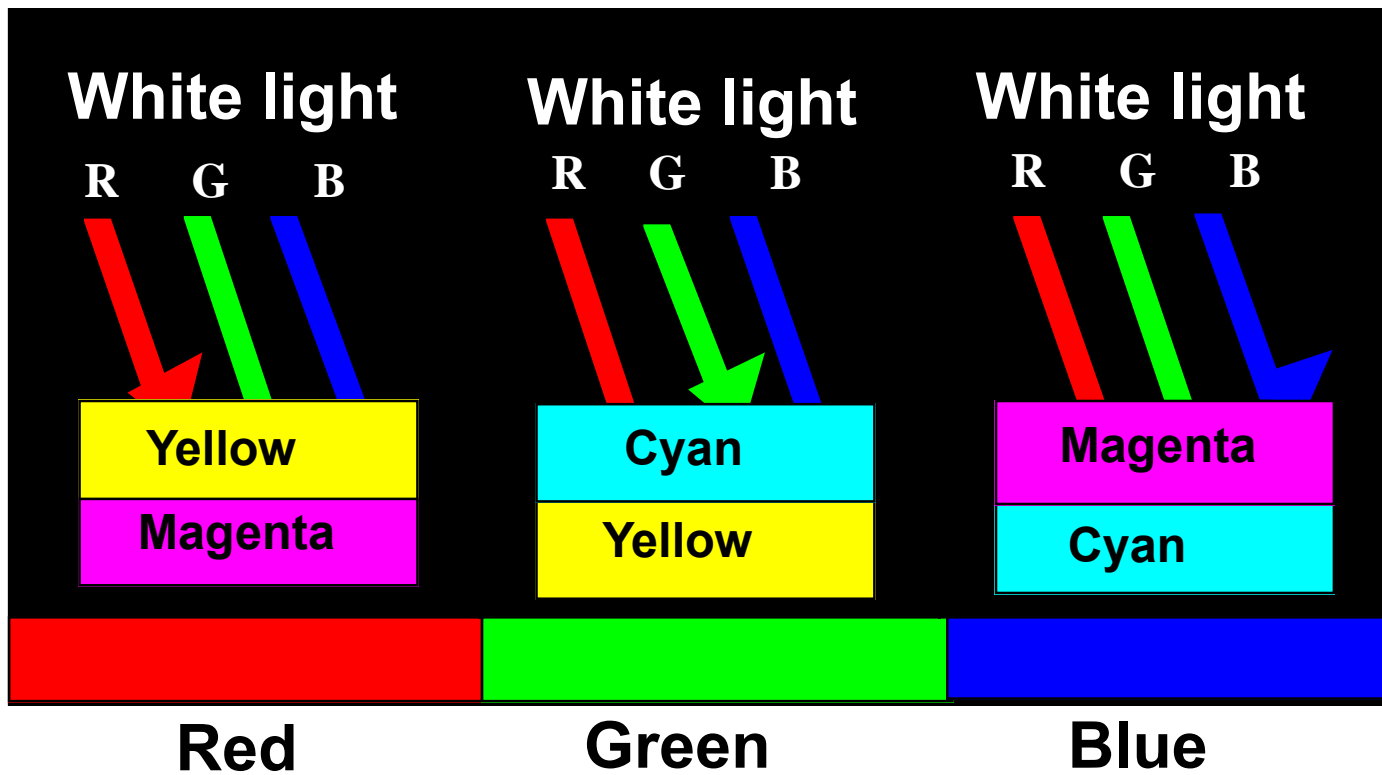
Practical Color Concepts



Ink Subtracts White Light



Over Print Colors

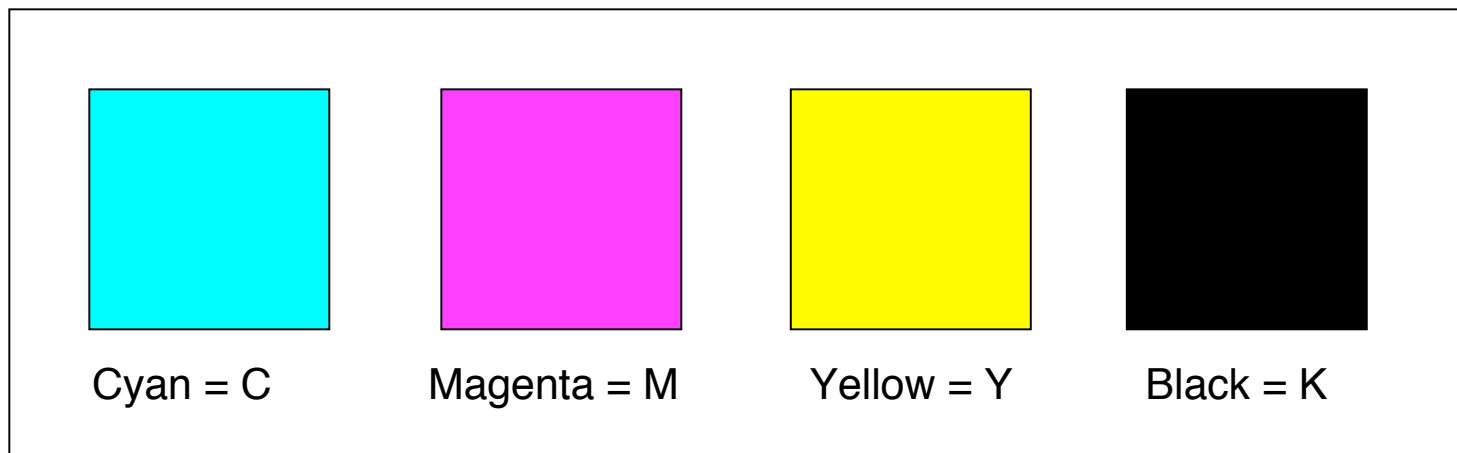


What are Process Colors?

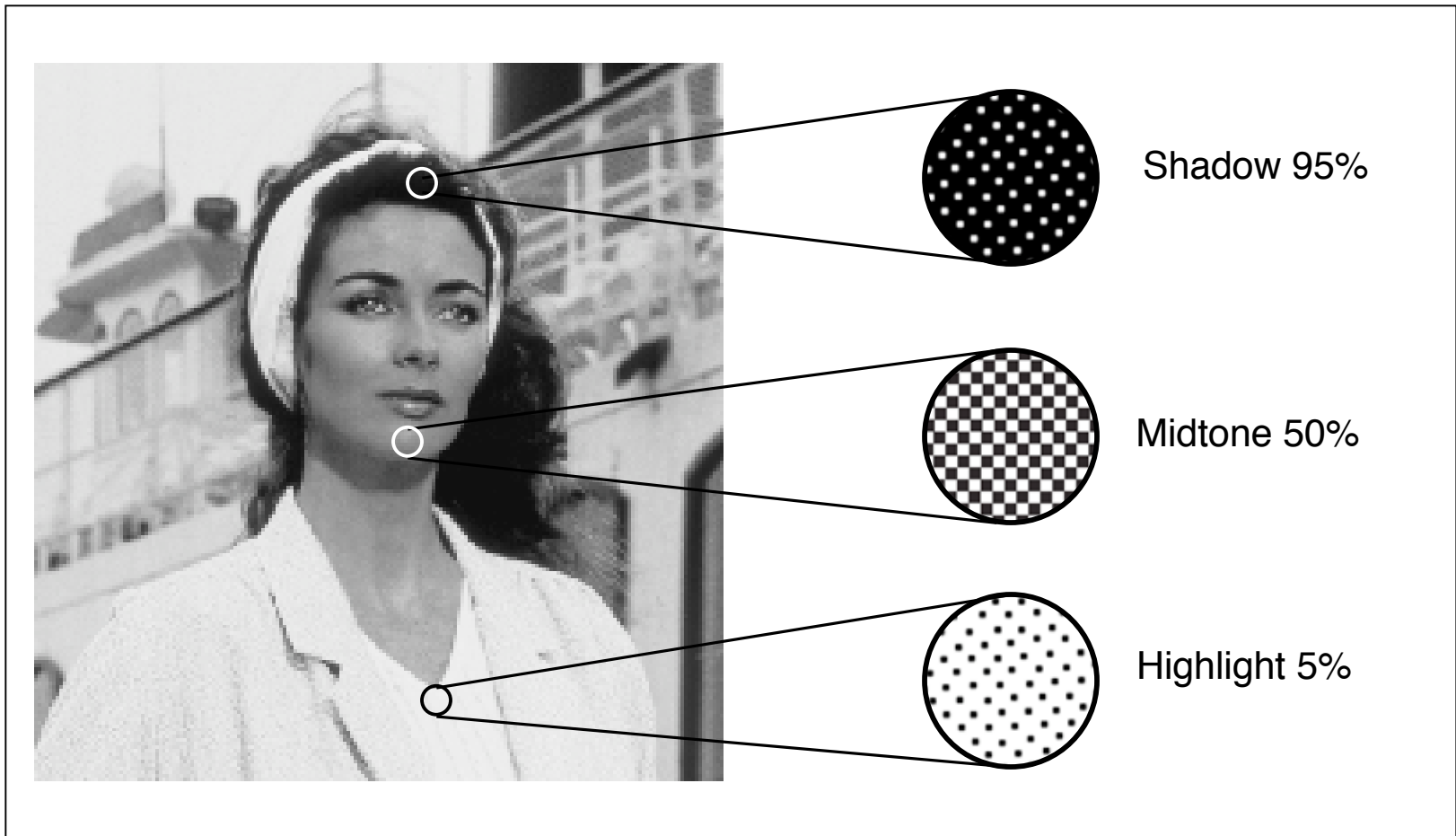
- The 4 color process is a system used to reproduce color builds and images
- Typically Cyan, Magenta, Yellow & Black inks are used for printing

4-Color Process Inks

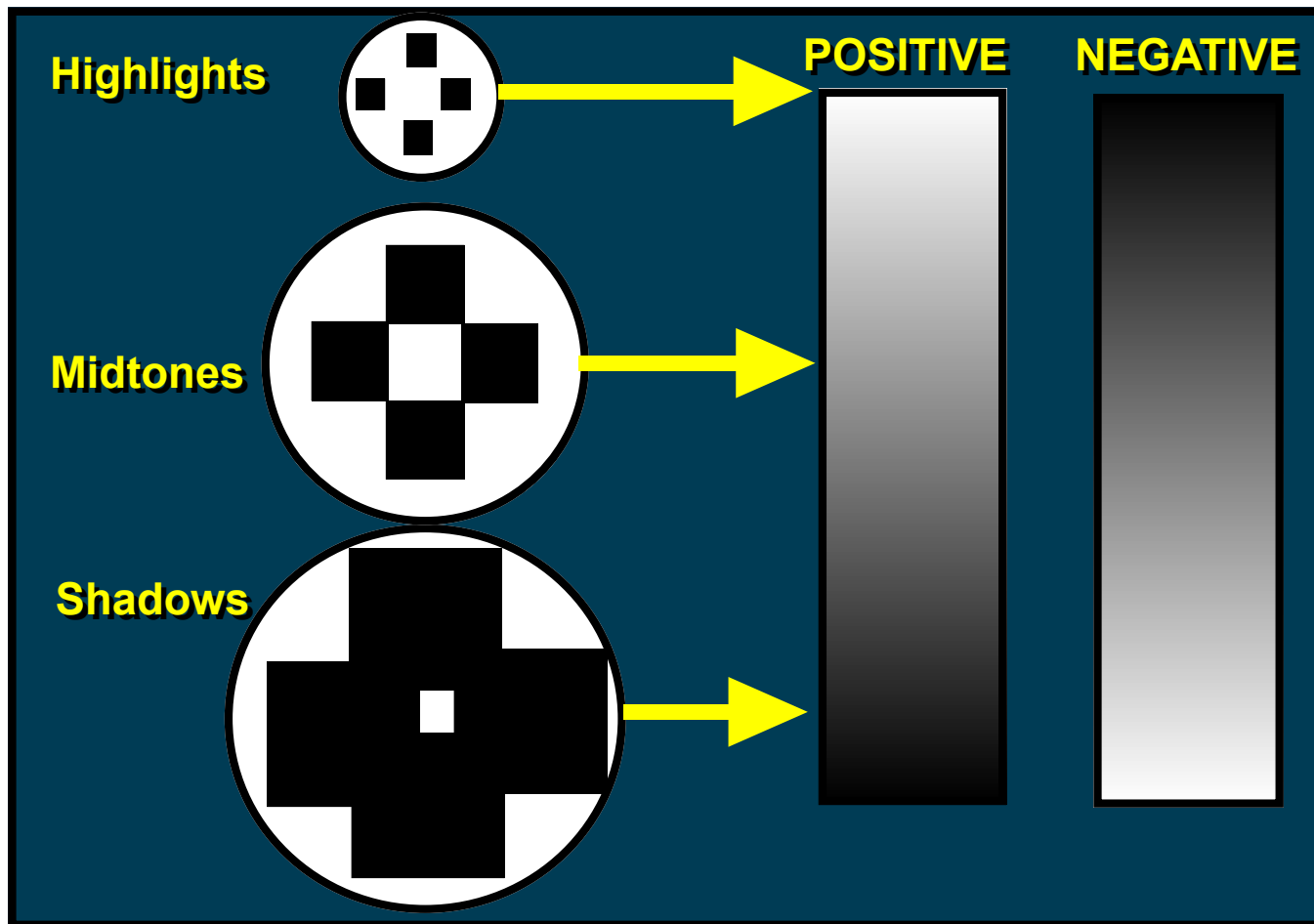
- CMYK inks are used in 4-color printing.



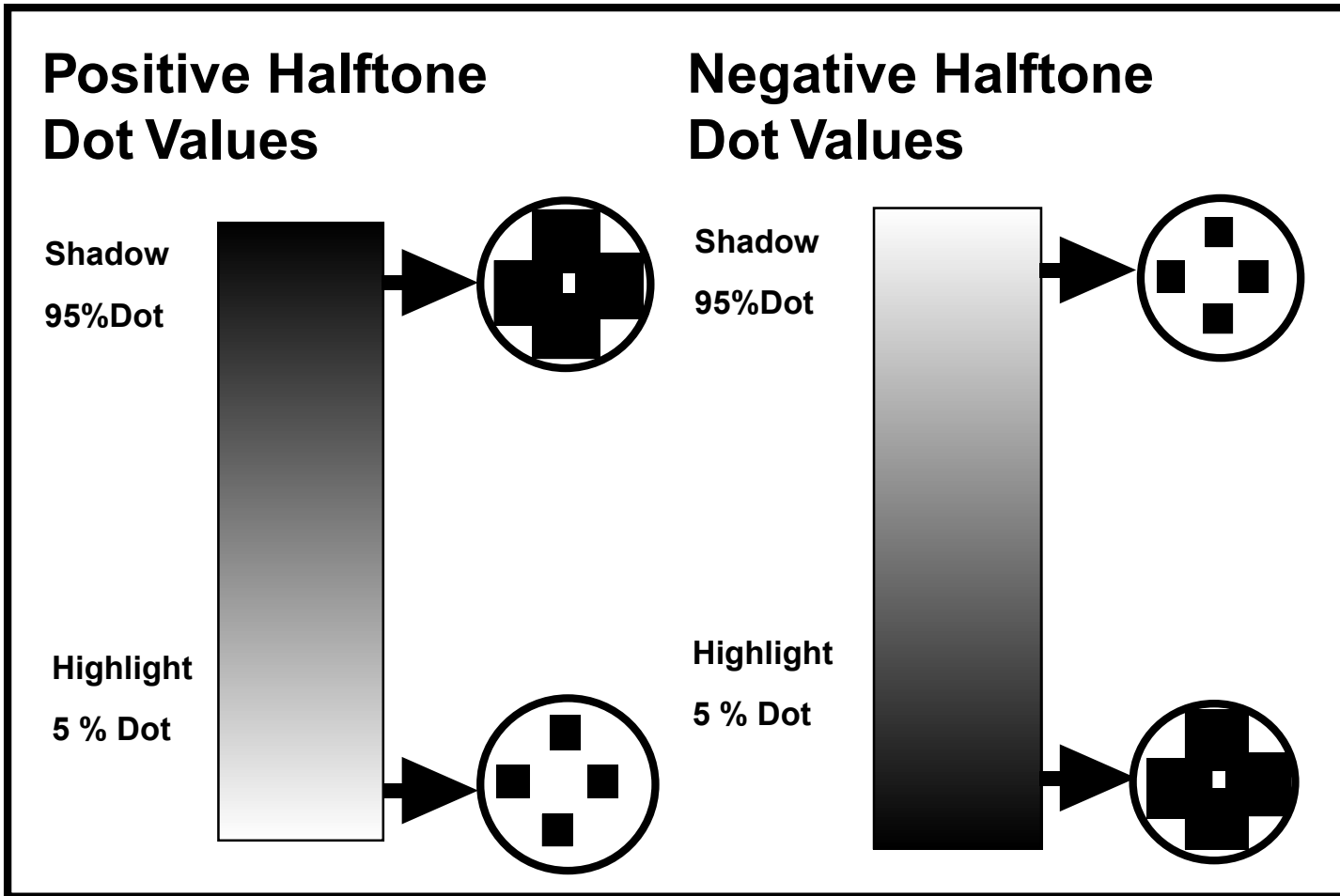
Halftone Dots Up Close



Halftone Dot Areas



Thinking Positive



Color Spaces

A variety of color models are used to represent color

Graphic Arts

- Color mixture system
Pantone
- 4 Color Process
CMYK
Halftone mixtures
SWOP

Computer Industry

- RGB: Red, Green Blue
- CMY: Cyan , Magenta, Yellow
- HLS, HSV, HVC
- Hue, saturation, lightness
- Hue, saturation value
- Hue, value, chroma

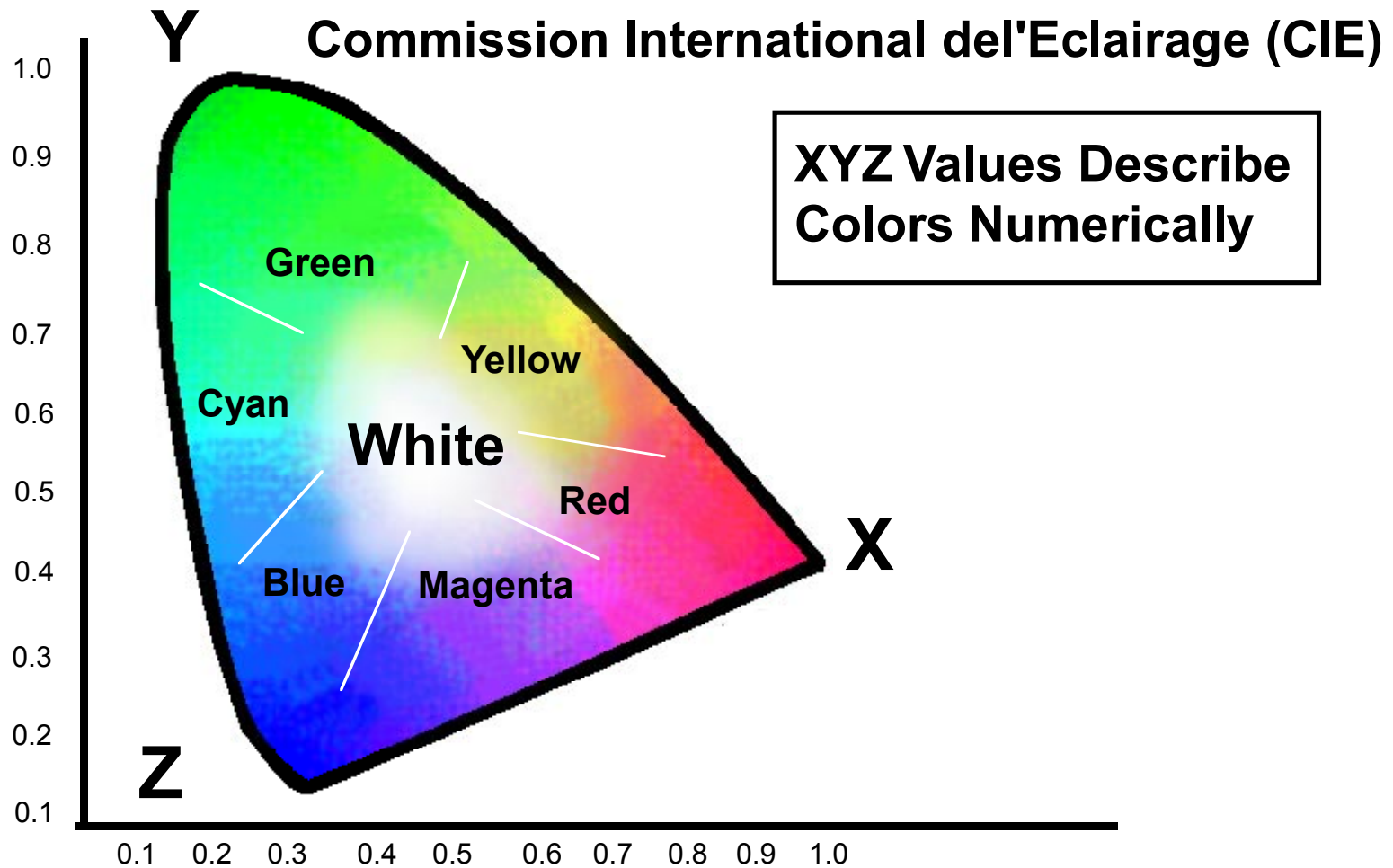
Universal Color Spaces

Commission International de l'Eclairage (CIE)
CIEXYZ - CIELAB - CIELUV

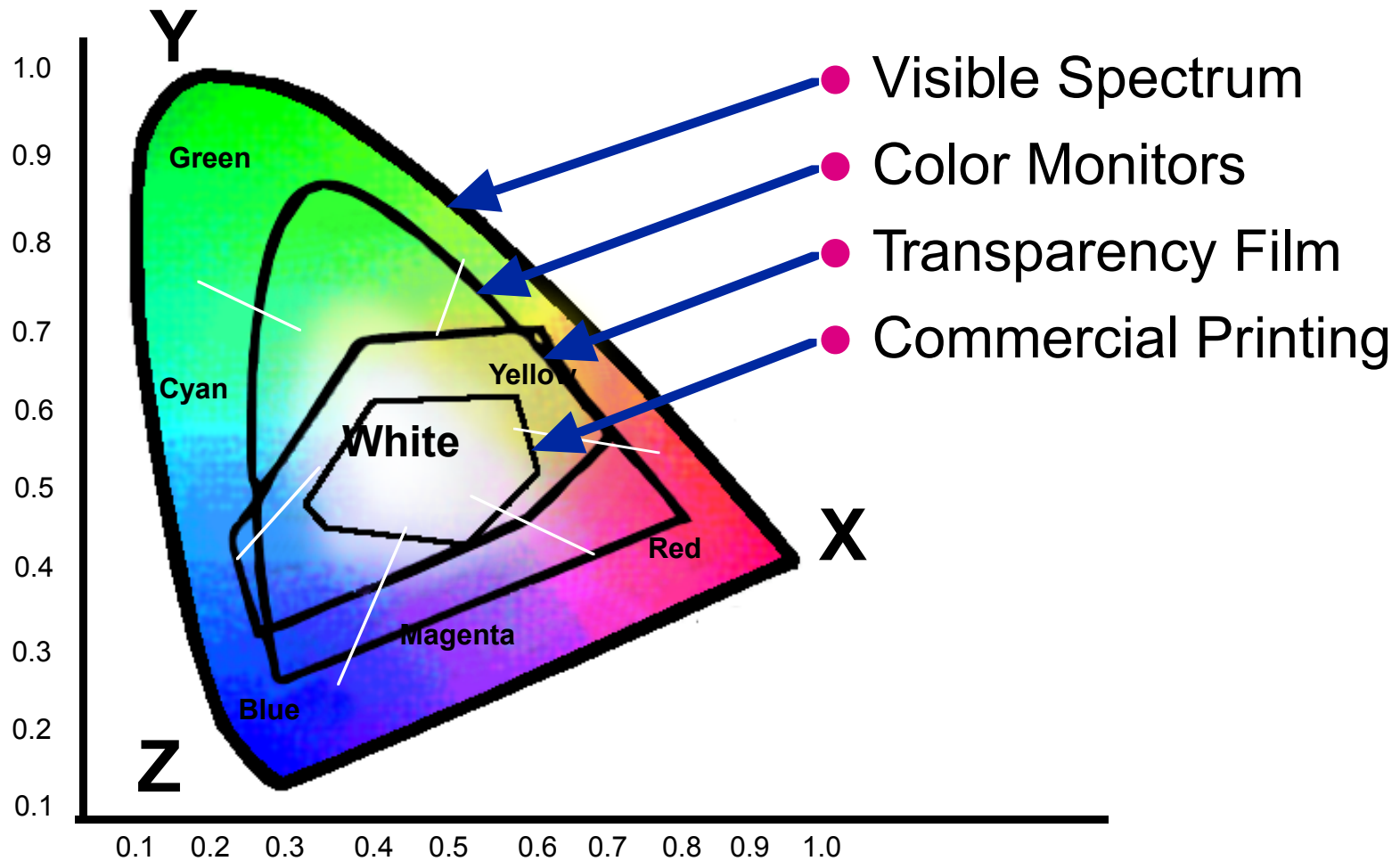
The CIE color system creates a method to describe how different color models appear



Describing Color w/ CIE



Color Gamut & CIE



The Monitor & Color Spaces

Monitors use RGB signal to display color

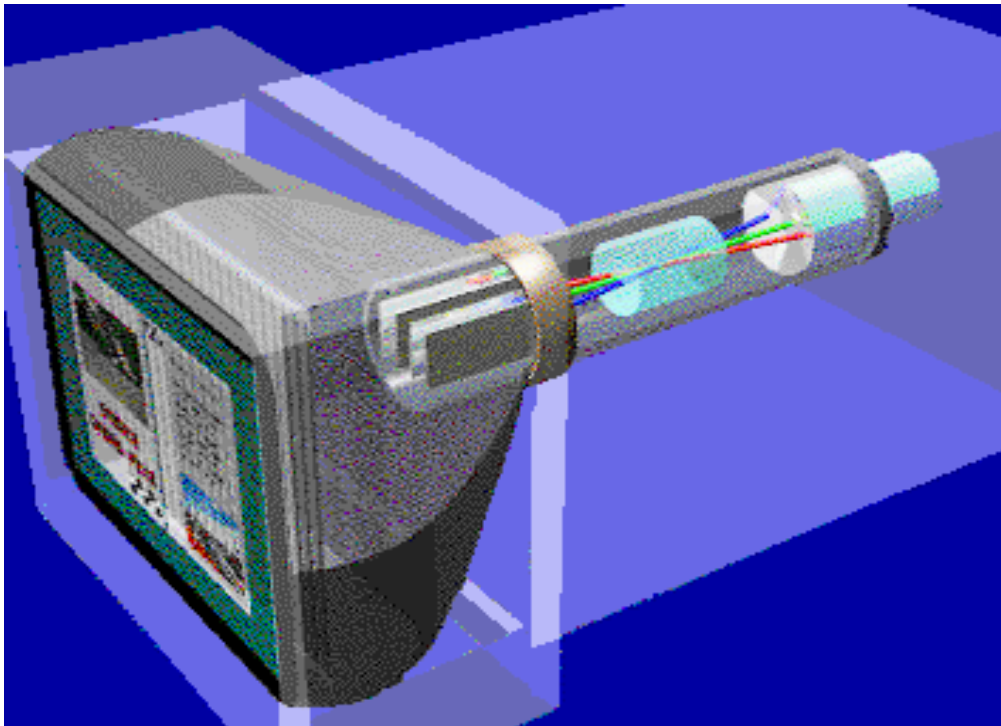


Image Reproduction Concepts

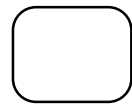
- Neutrality refers to gray image areas
- Tone Reproduction refers to image contrast
- Color Correction refers to the images hues not neutral areas of the reproduction
- These areas include colors like:
 - Red, Green, Blue, Cyan, Magenta, Yellow

Color Terminology

1. Neutral Gray



2. Image Contrast



• Highlight

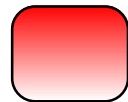


• Midtone

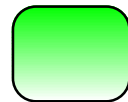


• Shadow

3. Colors Image Areas



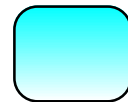
Red



Green



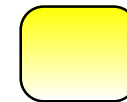
Blue



Cyan

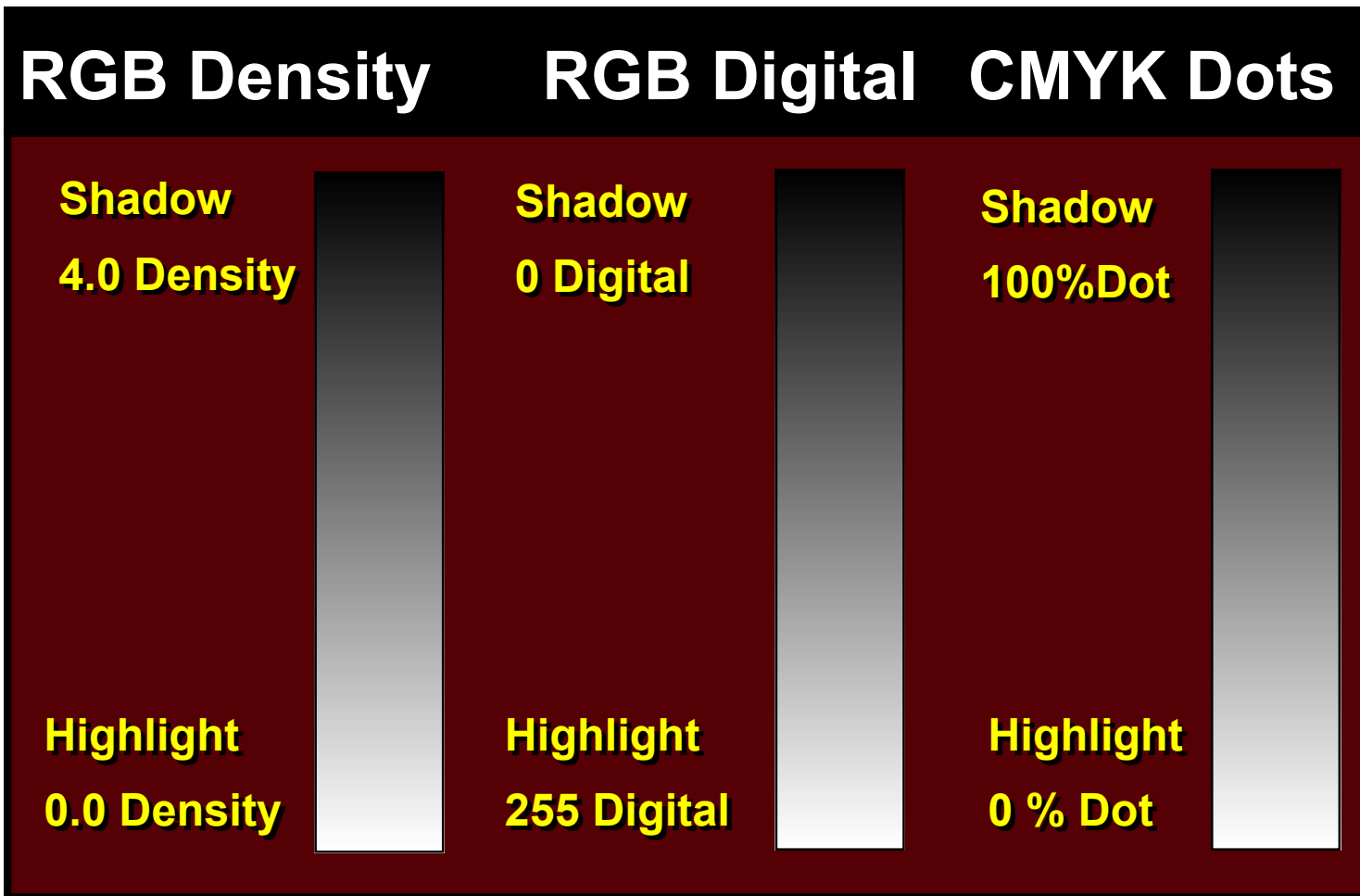


Magenta









Yellow

Important Measurements



Key Measurements

RGB Digital	CMYK Dot Values
<p data-bbox="436 704 764 867">Shadows= 0 Digital</p>   <p data-bbox="424 1123 751 1286">Highlight 255 Digital</p> 	<p data-bbox="1087 704 1415 834">Shadows= 100% Dot</p>   <p data-bbox="1117 1123 1402 1279">Highlight 0 % Dot</p> 

Neutrality

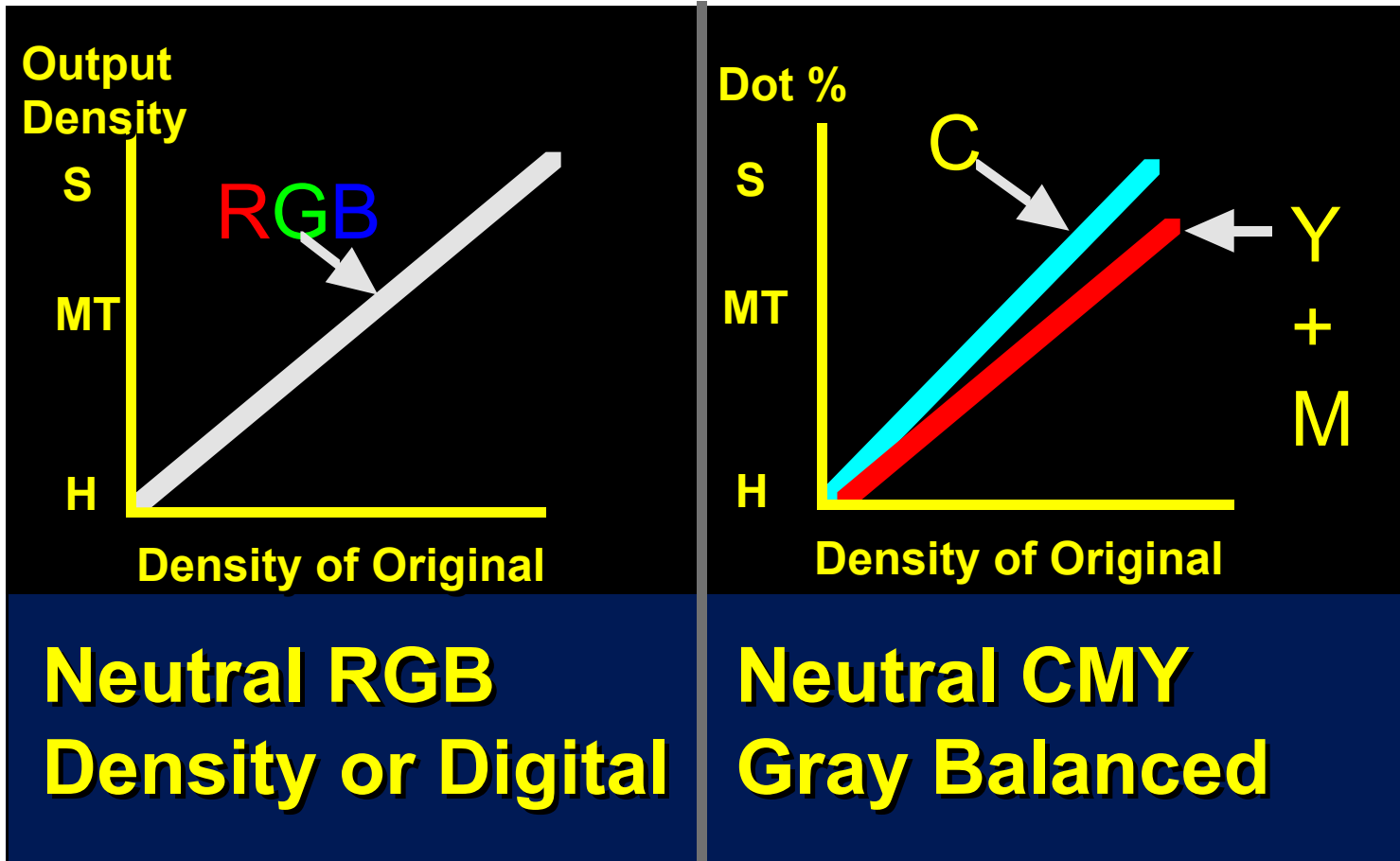
Highlights

Midtones

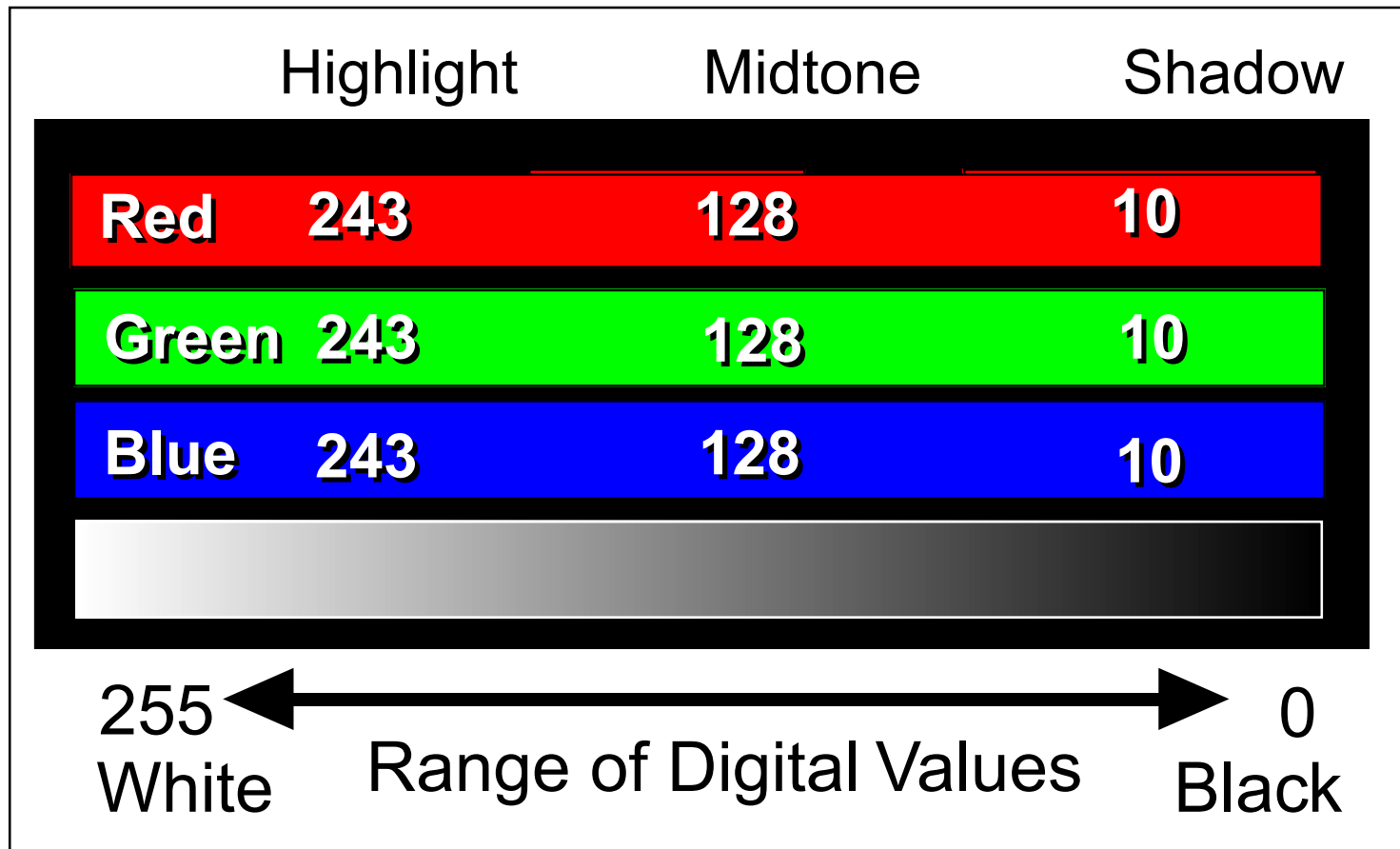
Shadows



Neutral Gray for RGB and CMY



Neutral RGB Pixel Values



Gray Balanced CMY Dot Values

Highlight	Midtone	Shadow
5%	62%	95%
3%	50%	85%
3%	50%	85%


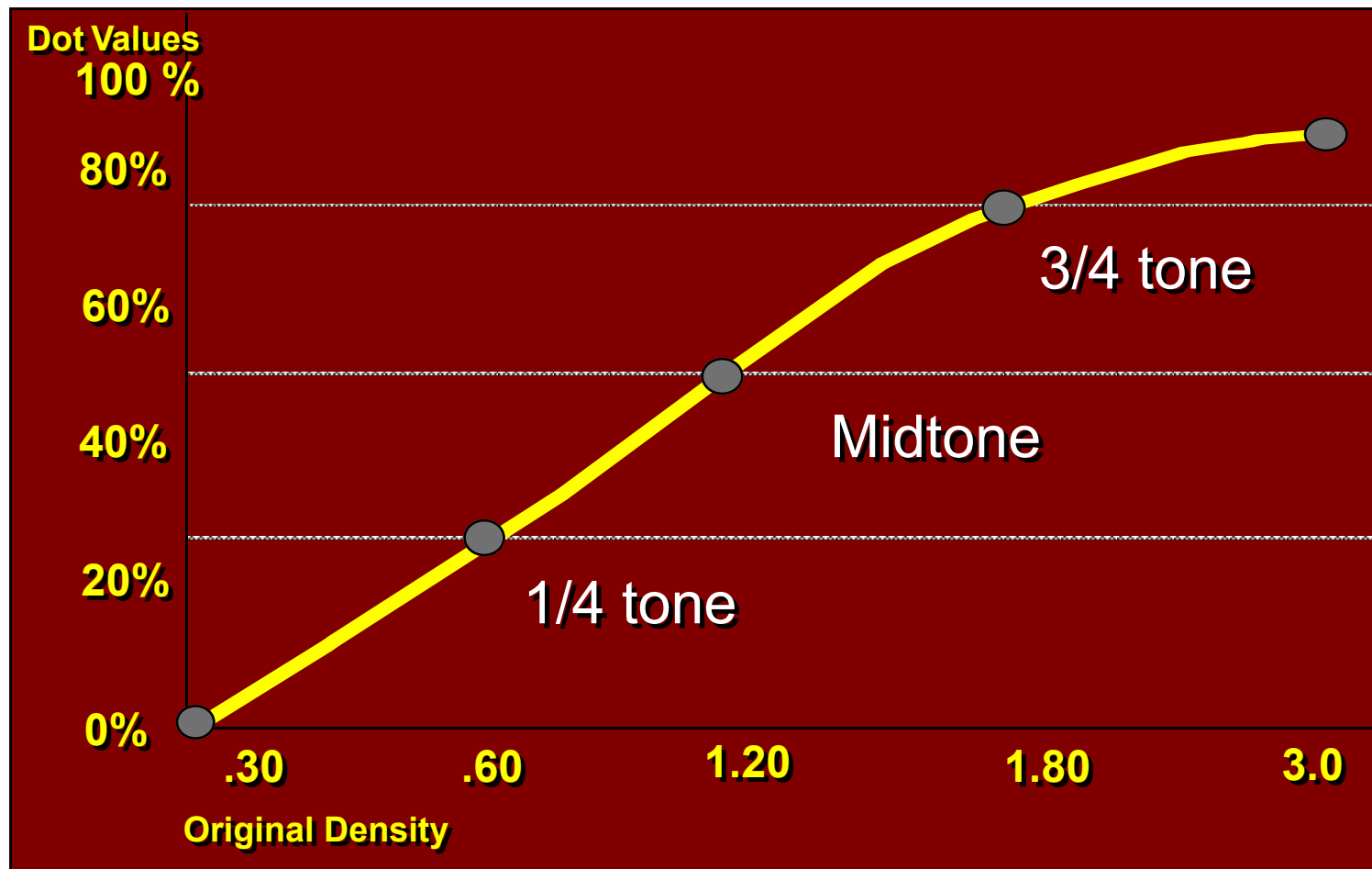
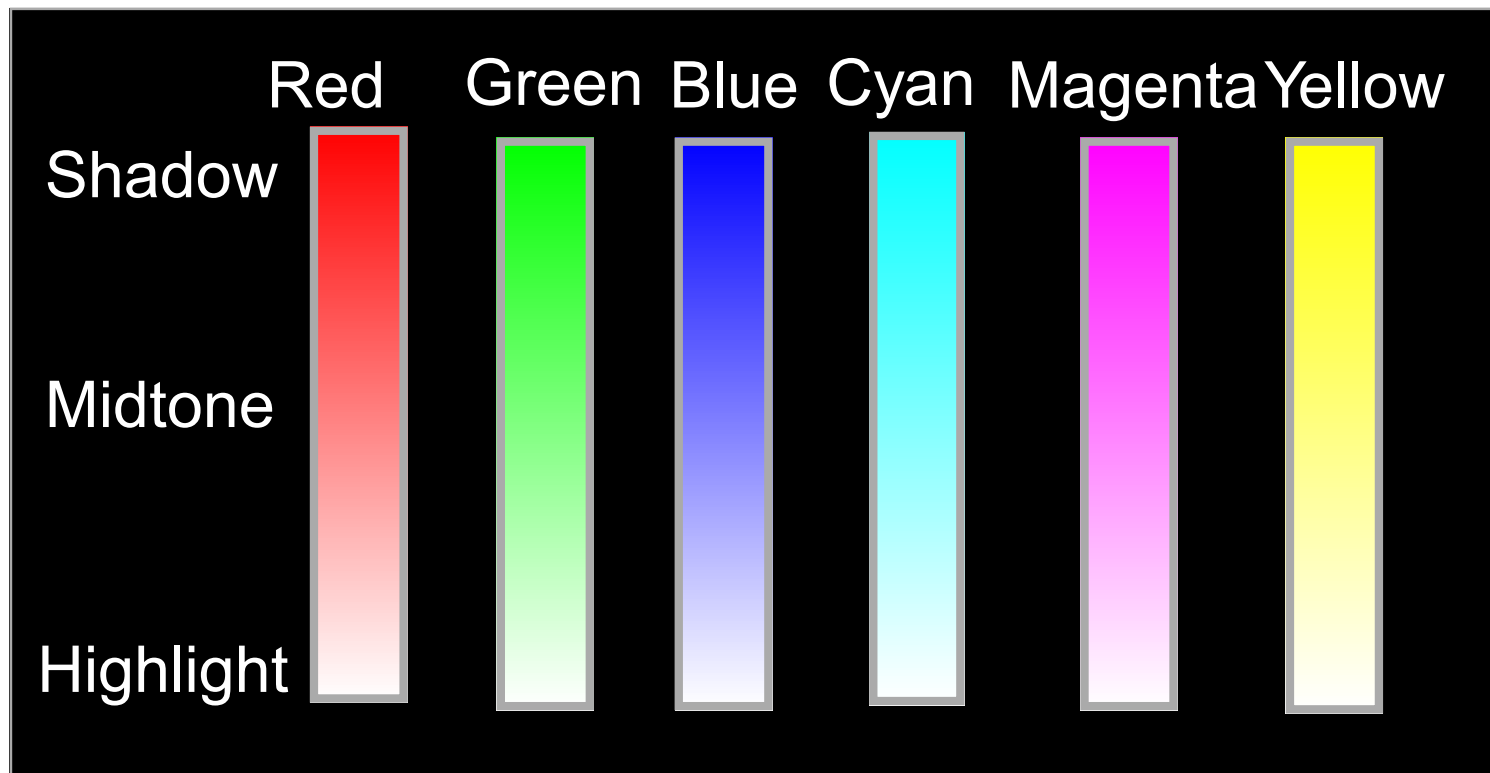


Image Contrast - Tone Reproduction



Selective Color Correction



Hue & Saturation

- **The Hue is the actual color such as:**
Red, Green, Blue, Cyan, Magenta, Yellow
 - In practice, color areas are created by determining the correct CMYK dot values



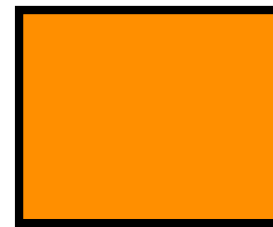
Red



Magenta



Yellow



Orange

Saturation

- **Saturation decides the brightness of a color**
 - A saturated color is bright
 - A desaturated color is more neutral



Saturated
Red

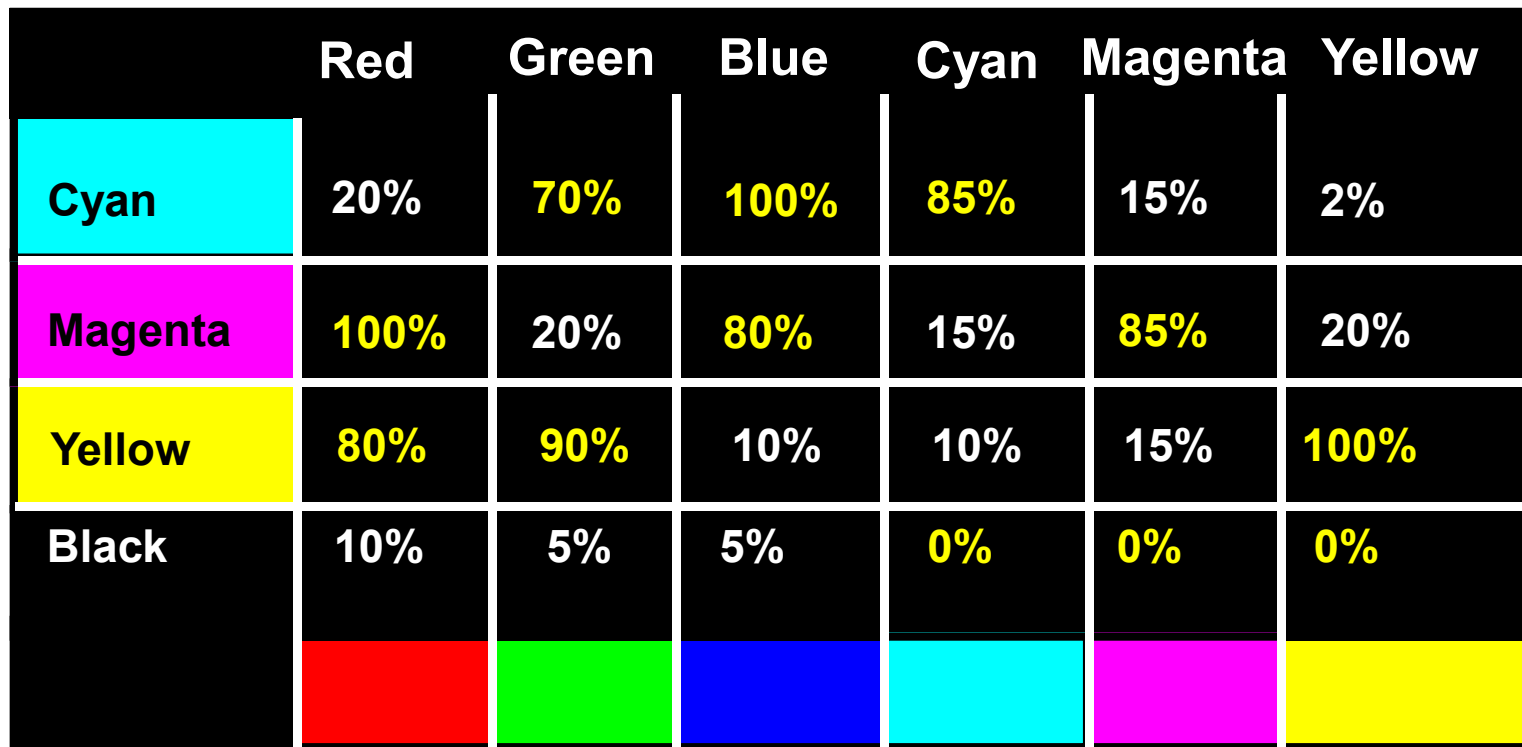
De-saturated
Red

Neutral
Gray

CMYK - Color Balances

Typical Solid Color Areas created with Halftones

	Red	Green	Blue	Cyan	Magenta	Yellow
Cyan	20%	70%	100%	85%	15%	2%
Magenta	100%	20%	80%	15%	85%	20%
Yellow	80%	90%	10%	10%	15%	100%
Black	10%	5%	5%	0%	0%	0%



Summary of Color Terms

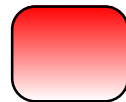
1. Neutral Gray



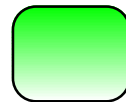
2. Image Contrast



3. Colors Image Areas



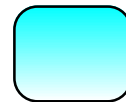
Red



Green



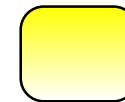
Blue



Cyan



Magenta



Yellow

Summary of Using Color

- Set your expectation realistically
- Producing color takes experience
- CIE is the underlying technology behind desktop color but...
 - printers specify color with halftone dot values