



Common Printing/Graphic Terms

A

Absorption – The conversion of visible light into a different form of energy as it interacts with matter, decreasing the amount of light transmitted or reflected. The result is a modification of the matters color.

Additive Color – An emissive color system used in image capture and display in which the additive primaries, red, green, and blue (*RGB*), are combined to form all other colors. When *RGB* light comes together at 100%, the result is white (as in white light)

Addressable Resolution – Highest *resolution* that can be achieved by the imaging mechanism of a scanner or printer in reproducing an image. Also see *optical resolution* and *interpolation*.

Adobe Acrobat – Software for viewing and printing files in Adobe's Portable Document Format (*PDF*), which was created so users can read documents without having the particular program or fonts used to create it. Adobe's *PDF Writer* and *Acrobat Distiller* are programs for creating *PDF* files.

AI – file format which is recognized by *Illustrator* software. These files are easily identified as they have ".ai" as the extension in the file name.

Aliasing – Visual stair-stepping of edges that occurs in an image when the *resolution* is too low for the size of the output. *Anti-aliasing* is the removal or softening of the rough edges (or *jaggies*) by averaging or blending of surrounding colors. See also *jaggies*.

Alpha – In an imaging program, color channels in addition to those used for the *primary colors* (e.g., RGB, CMYK); usually used for masking or controlling *opacity*.

Aspect Ratio – The height-to-width measurement of an image as displayed on a monitor. This can sometimes be altered when using a software's import/export feature and transferring an image from one computer to another. Ratio can also change with *pixel* size, although most computers use a 1:1 aspect.

Attribute – A distinguishing characteristic. The attributes of color are *hue*, lightness and *saturation*.

Anti-Aliasing – Process of mixing various amounts of surrounding colors to create fill *pixels*, which helps eliminate *jaggies* when enlarging low-resolution images.

Aqueous Inks – Inks that use water as a *carrier*. Typically, aqueous inks use either dyes or pigments as colorants.

B

Backlighting (backlit) – Advertising structures that house illumination in a box, casting light out through translucent advertising printed on plastic, vinyl or heavy-duty paper. Used primarily for high visibility at night.

Banding – A pattern of horizontal or vertical lines that occurs in solid colors, *continuous-tone* tints, *gradations* or images, instead of a smooth color or transition or colors. Banding can appear on computer monitors when viewing images with less than 24-bit information, or on printers due to a problem with the shape of the curve.

Bezier Curve – A type of curve defined by a line and a point, used in computer drawing programs to create *vector* artwork and type. Programs have 2 control points at ends of line segments used to define the shape and curve.

Bitmap – Graphics constructed of individual *pixels* arranged in specific patterns. Bitmap-image formats include, by filename extension:

AI = Adobe Illustrator Encapsulated *PostScript*
BMP = Windows Bitmap
EPS = Encapsulated *PostScript*
GIF = Graphics Exchange Format
JPEG or JPG = Joint Photographic Experts Group
PCD = Kodak Photo CD
PCX = ZSoft Paintbrush Exchange
PDF = *Adobe Acrobat* Portable Document Format
PICT, PCT = QuickDraw Picture Format
RTL = Hewlett Packard Bitmap Format
SCT = Scitex
TGA = Targa
TIF or TIFF = Tagged Image File Format

Black – The absence of light. A color produced when an object absorbs all wavelengths of light rather than reflecting some of them, as other colors.

Black Generation – Addition of a black layer to the *process colors* (cyan, magenta, yellow) when converting an *RGB* color image to *CMYK* mode. Usually handled in one of four ways: short-range black, used with camera/enlarger *color separations* made through colored filters; long-range black, used in electronic scanners and *color separation* software; *UCR* black; or *GCR* black.

Bleed – Printing an image past where the final print will be trimmed, which allows color to extend all the way to the edges of the final print.

Blooming – A “digital overexposure” caused by exposing a *CCD* element to too much light while scanning an image. It can produce distortions of color and image detail.

BMP File – The file extension .bmp indicates a Windows bitmap graphic.

Bounding Box – In *PostScript* page-description language, a rectangle defining the area of an image. The area of an on-screen image at

its maximum X and Y axes measurements. Altering the bounding box by moving its control points can change the shape or size of an image. Bounding boxes allow scaling of graphics in page-layout software.

Brightness – The property of light reflectivity in paper or emission on a computer screen. Paper brightness (R457) is defined as reflectance of blue light at the 457-nm wavelength. On a scale of 0-100%. Monitor brightness is measured in candelas per meter squared (cd/m²). Media with different brightness levels can cause changes in the appearance of colors, requiring adjustments in *calibration*.

Bulletins – Large billboards usually 14' x 48', 10'x 6" x 36', or 20' x 60'. When the method of reproduction is painted directly on the sign face, the bulletin is called "paint" or "painted bulletin".

C

Calibration – Conformance of a device (scanner, monitor, printer, measurement instrument) to known specifications. The process of bringing all devices in a digital imaging system into conformance with specification, in order to achieve accurate and consistent color reproduction.

Camera Raw – An image file format for digital cameras containing unprocessed data. Also called RAW (not an acronym) or *CCD-RAW*, the format is proprietary and differs between camera makers (and sometimes between models from one manufacturer). RAW image files must be processed and converted to an *RGB* format before they can be manipulated by a *bitmap* graphics editor, printed or displayed by a Web browser.

Carrier – Substance in which pigments in inks are suspended. *Aqueous*, solvent and *eco-solvent* carriers evaporate after printing. *Monomers* are considered carriers in *UV-curing* inks, but are transformed into solid *polymers* after curing.

CCD (Charge-Coupled Device) – A sensor used in digital input devices (scanners, cameras, measurement instruments) to record images. These consist of an integrated circuit containing an array of linked capacitors under the control of an external circuit.

Chromatic Adaptation – Ability of the human eye to vary color perception under varying light by adjusting to the *white point* of the illumination. Some colors look the same in different levels of light. This ability is not held by reproductive techniques such as printing.

Chromaticity – The quality of a color as determined by its purity and dominant wavelength, which is relative to *saturation* and *hue* as used in the *HSV* model.

Chrome – High-quality positive color film, ordinarily shot by professionals. It includes 35-mm slides, 2 ¼” x 2 ¼” medium-format film and 4” x 5” view-camera transparencies. Chrome positives are often used for proofing.

Chrominance – The property of a color that describes its *saturation*, *intensity*, or colorfulness, used in differentiating two colors of equal *brightness* and *hue*.

CIE (commission Internationale de l’Eclairage) – An international color-standards body based in Vienna, Austria. The CIE’s *chromaticity* diagram is a two-dimensional reference for defining color and color spaces based upon physiological measurements of human color vision. An abbreviation for the CIE L*a*b* (CIELAB) *color space*.

Clean Color – Color made from one or two *pigments*, usually of high *saturation*.

CLUT (Color Look-Up Table) – A digital color-processing tool for converting color from one *color space* or device to another, such as from *RGB* (scale, 0-255) to *CMYK* (0-100%)

CMYK (Cyan, Magenta, Yellow, and Black) – The four *process colors*, which are used by output devices such as *inkjet*, *electrostatic* and *thermal* transfer printers. Black is called “K” because in process printing it is the key plate or keyline color. Mixed to provide a color

image; typically used in printing applications.

Color Calibration – Software and/or hardware that coordinates the color match between two or more digital devices.

Color Curve – Visual control used in photo-illustration and other graphics software to display color measurements and make tonal changes to an image.

Colorimeter – An optical device that measures absorbance of light by filtering reflected light into regions of red, green and blue. While dedicated colorimeters do exist, most instruments actually spectrophotometers that compute colorimetric values based on spectral reflectance or transmittance curves.

Color Management – Refers to coordination of color among input, display and output devices. In output, color management is often handled on a device-by-device basis by imaging production software (see *RIP*). In display and other tasks, coordination often comes via device-specific software such as Apple *ColorSync* or Adobe Photoshop.

Color Modes – Models of tones based upon different coordinate values, such as; *hue, luminance, and saturation* (HLS); *hue, saturation and brightness* (HSB); *hue, saturation and value* (HSV); red, green and blue (*RGB*); and cyan, magenta, yellow and black (*CMYK*).

Color Separation – Color separations consist of artwork that has been split into component plates of cyan, magenta, yellow, and black in preparation for process printing (CMYK) or into the required number of plates for spot color printing. Each separation prints a single process or spot color. Digital files can be composite separations (all information in one file) or pre-separated (each color on its own page).

Color Space – Definition of color by theoretical three-dimensional graphing. Colors are determined by plotting points using particular *values* (such as red, green and blue). Used in most cases to represent the range of variations of particular color combinations, such as *RGB* or *CMYK*.

Color Specification – Numeric *values* used to specify a color within a color system.

Color Theory – A set of basic rules for mixing color to achieve a desired result.

Color Wheel – The colors of the visible spectrum arranged in a circular fashion. A traditional wheel features 12 colors; three *primary*, three *secondary* and six *tertiary*. Computer-based color uses a wheel based on the RGB model, with the CMY model as the secondary colors.

ColorSync – System-based *color management* software developed by Apple Computer; manages the color between digital devices by comparing each device's color description to the standard *CIE* color mode.

Compression – In *color management*, *gamut* compression refers to the ability of software to reduce the range of colors in an image to that which can be reproduced on an output device. In image processing, file compression refers to reducing the size of a file through an alternate encoding process.

Continuous Inkjet – Process where ink is pumped through inkjet printing nozzles at a steady pace. Droplets are either shot onto a substrate/material, or electrically charged and deflected away from the printable surface and into a collection system.

Continuous Tone – Method of printing in which equally sized color dots are placed in a variable-spaced pattern, creating the effect of more natural color transitions.

Contour Cut – with print-and-cut digital-printing device, the ability to cut around the outline of an image, both on the outer border and along any internal closed-loop borders.

Cutouts – Special productions or additions to the face of a sign that are raised or extended beyond the border of the standardized area. Cutouts can include letters or objects used to achieve a three-dimensional appearance (also called extensions or embellishments).

D

Delta-E (DE) – Measurement unit in a uniform *color space* of the perceivable differences in color viewable by the human eye. The first noticeable change is 1 DE. Delta-E measurement is used, for example, by customers specifying and accepting color, and in manufacturer guarantees of colorfastness.

Densitometer – Device used to measure light reflectance from a substrate or transmittance through a film on a scale of 0-100%, which is then converted to a logarithmic scale of 0-infinity (0-4 in practice) to correspond with human vision (density = $\log 1/\text{reflectance}$).

Device-Independent Color (DIC) – Color-matching system based on a universal set of *values*, instead of being based on the color *gamut* of one particular piece of equipment.

Dielectric Media – Specially treated substrate that holds an electrical charge for direct printing by and *electrostatic printer*.

Digital Printer – Printing device that is capable of translating digital data into hardcopy output. Technologies employed in digital printers include *inkjet*, *thermal transfer*, *electrostatic* and laser photo-imaging.

Digital Contract Proof – A high-quality color sample suitable for predicting color appearance on a lithographic press or production printer, produced on a lower-cost *inkjet*, *dye sublimation*, or other *digital printer* without the use of film.

Dithering – Process that simulates color variations or shades of gray by varying the sized and shapes of pixel groupings, rather than an ordered array of halftone dots. This reduces the contrast between dots of different colors/shades and creates a more-flowing, natural look.

Dirty Color – Color made from three or more *pigments*. Three third

pigment functions to reduce the *saturation* or the color.

D-min/D-max – Measurement of the density range of a photo, transparency film or printed sheet, indicating its ability to absorb light. On a scale of 0-6, D-min has the lowest absorption (as white or clear), while D-max has the highest.

DOD (Drop-On-Demand) – Printhead technology in which inkjet nozzles fire ink only when color is needed instead of firing ink continuously and being deflected away from the substrate when not needed as in *continuous inkjet* systems.

Dot Gain – Effect produced when individual dots in a *halftone* screen or other patterns print larger than their intended size, resulting in darkening of a printed image. Sometimes referred to as “tone *value* increase” in recognition of devices, like inkjet printers, that don’t use conventional *halftone* dots.

Double Sided – Many banners and signs have imaging printed on both sides of the material, as they will be viewed from either side when installed. Certain substrates will allow this without “ghosting” (the image from side being viewable from the other side).

DPI (Dots Per Inch) – Unit of measure used to describe the printing resolution of an output device, or the printed *resolution* of an output device, or the printed resolution of images, based on the number of separate ink droplets representing either horizontally or vertically in one inch. Also correlates to *pixels per inch* and *samples per inch*. DPI is a significant influence on the size of an image file; a high DPI indicates higher resolution.

Drum Scanner – Scanner where color prints or transparencies are mounted to a rotation drum. As the drum spins, light from the image enters a lens, where it is recorded by one or more photomultiplier tubes (*PMT* tubes). Usually records more digital information than the *CCD* device, allowing for better image manipulation and printing detail.

Dye – A colorant that dissolves in water. Vegetable-based dyes are often used to produce non-outdoor-durable inks for large format ink-

jets.

Dye Sublimation – Color printing technology that creates a photographic-quality image by delivering gaseous *dyes* to a receiver material using a thermal transfer system usually involving transfer paper and a heat press.

Dynamic Range – Measurable difference between the brightest highlight (white) and the densest *value* that any system can create; also the range of gray values that a system can reproduce. Higher values show greater ability of a product to effectively contrast highlights and shadows.

E

Eco-Solvent Inks – A type of *solvent ink* that employs a less-toxic carrier, generally dipropylene glycol monomethyl ether. Printers using eco-solvent inks emit fewer harmful VOCs (volatile organic compounds) than standard *solvent inks*.

Electrostatic Printer – Printing device based on xerography (the process on which most paper copiers are based). Electrostatic (also called e-stat) printers transfer toner *resins* or *dyes* from an electrically charged plate or writing nibs to the substrate, then thermally sets it.

Embedded Files – Pertains to Adobe Illustrator files. Embedded artwork actually becomes part of the Illustrator document. This can dramatically increase the size of the file and slow down processing speed. It does ensure that an image will be included when you send the file to be output.

Embedded Paths – Paths are hard-edged outline objects within image that isolate portions of an image. Graphics exported for use in other application can contain embedded paths which are often used as clipping paths to remove backgrounds or create non-rectangular shapes in page layout applications.

EPS (Encapsulated PostScript) – An Adobe graphic file format; allows different information, such as colors and fill patterns, to be carried between software programs. Files can include *bitmap* and *vector* information, including *low-resolution* files for thumbnail previews. Versions of this include variations from Adobe Illustrator (with .AI filename extensions). EPS files hold both low-resolution view files and high-resolution postscript image descriptions.

Equalization – Image-processing technique in which the range of tones or colors in a file are expanded to produce a better image.

Error Diffusion – *Screening* technology used in digital continuous-tone printers where fixed-sized dots are placed based on image detail and tone *values* to enhance detail.

Expanded-Gamut Color – System in which additional color (usually *light cyan, light magenta, light yellow light black, green and/or orange*) are used to supplement *CMYK* in order to reproduce a greater number of colors. Also see *Hexachrome, hi-fi color*.

Extensions – Method of extending the copy area outside of the billboard frame (See cutouts).

F

Film Recorders (CRT & Drum) – A device used to transfer digital files onto film materials at a higher photographic-quality *resolution*.

Flattened Image – In a flattened image, all visible layers are merged into the background, greatly reducing file size. Flattening an image discards all hidden layers and fills the remaining transparent areas with white. In most cases, you won't want to flatten a file until you have finished editing individual layers.

Flexible Face – Single sheet of flexible vinyl with advertising message printed on one side. Also referred to as flex face.

Foil – Donor sheet of color used in thermal transfer printing.

Four-Color Process – Any printing method that utilizes the subtractive primaries (CMY) plus black (K) to create the illusion of different colors.

Fully Wrapped Bus – Specially commissioned transit display in which the entire vehicle, including windows, is covered with the advertising design. Passengers have visibility out of the windows due to special material.

FTP (File Transfer Protocol) – Technically, FTP is a language used to move files; however, the term commonly refers to the process of sending a file via FTP or to an FTP site. FTP is used as opposed to HTTP, which is the language used to write web pages, The 'ftp' or 'http' that precedes a web address tells a web browser which language it should use when processing the request

G

Gamma – Slope of the line that represents image output *values* versus image input values. Used to describe the contrast of a monitor or scanner.

Gamma Correction – Non-linear tonal correction that edits an image's *gamma* curve.

Gamut – Slope of colors that can be reproduced by a specific display or output device, or by a *primary color* system (such as *RGB* or *CMYK*).

Gamut Compression – Reducing the color *gamut* of an image so it can be displayed or output within the limits of a particular device.

Gradation – Steps of transition between two colors between black and white. This is performed by progressively mixing percentages of a dominant and secondary color in alternation. (Sometimes referred to as “gradient.”)

GCR (Gray Component Replacement) – *Color separation* process in which black ink is used to replace cyan, magenta, and yellow (*CMY*) in mid-tone and highlight areas where the three inks overlap, in order to reduce ink consumption and drying time. (Similar to *UCR*.)

GIF (Graphic Interchange Format) – An image format type generated specifically for computer use its resolution is usually very low (72 dpi, or that of your computer screen), Making it undesirable for printing purposes.

Grommet – Metal rings which can be inserted along the edges of a banner/billboard to be used for installation purpose, Hem: A process whereby vinyl is welded (not sewn), using intense heat to seam two or more pieces of vinyl together.

H

Halftone – Process of reproducing an image using a series of various sized dots within a fixed spacing, measured in lines per inch (lpi).

Hexachrome – A type of *hi-fi color* system developed by Pantone Inc. that used *CMYK* plus orange and green to extend the available color *gamut* beyond ordinary *CMYK* in order to reproduce more *PANTONE* colors without using individual spot-color inks.

Hi-Fi Color – Alternative printing process that extends the tonal capabilities of printing presses. The system employs *stochastic screening* and five-, six-, or seven-color printing to expand the possible color *gamut* beyond that of traditional four-color process.

Highlight White – Printing application in which white ink is used to enhance an image, sharpen colors or add contrast.

Hi Res – Refers to files which have a "high resolution" DPI or 'dots per square inch' count

Histogram – Graphical display that represents the distribution of tones within an image.

HLS (Hue, Saturation and Lightness) – A non-linear color space (also called HSL or HIS) that defines color using a double hexcone.

HSV (Hue, Saturation and Value) – A non-linear transformation for the *RGB* color space often used in describing the characteristics of how devices display color. The HSV model is also called HSB (Hue, Saturation, Brightness).

Hue – The property of the color indicates the color name, such as purple, blue, or green, that can be specified by particular wavelengths or by *CIE* coordinates. It ranges from 0-360, but is normalized to 0-100% in some applications.

I

Inkjet Printer – Device that drops liquid ink onto a substrate for printing. A thermal *inkjet* heats ink to approximately 400 degrees F inside a small chamber before shooting it through a series of nozzles. A *piezo*-based inkjet stores ink in a small chamber and sends an electric charge through piezoelectric crystal lining the chamber to shoot ink through the nozzles.

Intensity – Degree of *saturation* or *reflection* of visible light.

Interpolation – Software technique used to increase the size of an image file by creating more *pixels*, using mathematical averaging to increase tonal *value* and apparent *resolution*.

Invariant Color – A color that is not altered by a change in illumination.

J

Jaggies – The informal name for *aliasing* (visual stair-stepping) in raster images that occurs when the *resolution* is too low.

JPEG/JPG (Joint Photographic Experts Group) – Graphic file format designed for use with photographs and other color bitmaps. The JPEG format uses a mathematical compression technique to reduce file size by removing a user-selectable percentage of the images data information. Usually used for compressing full-color or grayscale images. Primarily used for screen and web display rather than printing due to its low resolution.

K

King Size Bus Poster – Posters affixed to the sides of public buses, with a copy area of 27" high by 141" wide. Also known as "bus king".

L

L*a*b – *Color space* calculated with *values* of lightness (L) and attributes of red-green (a) and yellow-blue (b). Most commonly associated with *CIE* for a non-device-dependent coordination of color. The two dimensional reference defines colors and color spaces based upon physiological measurements of human color vision.

Layers – Pertains to Adobe Photoshop and Illustrator files. Layers are best described as sheets of acetate stacked one on top of the other. Where there is no image on a layer, you can see through to the layers below. All layers in a file have the same resolution and have the same color characteristics.

Light Magenta/Light Cyan (Lm/Lc) – Muted or diluted forms of two

subtractive primaries which, when used with *CMYK* inks, enable finer highlight detail, expands color gamut and provides a less noticeable dot structure for more natural-looking *continuous tone* prints.

Line Screen – The frequency of dots in *halftone screen*, used to define the density of the screen. A 133-line screen has 133 *halftone* dots per linear inch. The higher the number, the higher-quality of detail reproduction.

Linear Scanner – Scanning device that uses a straight-line array *CCD*. The linear array captures one line of the image at a time as the *CCD* is moved over the entire image in steps.

Linearization – The process of calibrating the *time values* on a scanner or printer to create evenly distributed tones capable of rendering detail throughout an image.

Low Res – files which have a "low resolution" DPI or "dots per square inch" count

Luminance – The lightness or brightness of an image.

LUT (Look-Up Table) – A digital image processing tool for converting color data from one system to another (e.g., *RGB* color to *CMYK*), including compensation for the output characteristics of a particular device, ink and substrate. An example would be a LUT that corrects the color balance for an output device to match the characteristics of a substrate (i.e., appearance, absorbency, etc.).

M

Metamerism – A condition in which a color matches under one light source but not another. The four types are Sample, Illuminant, Observer and Geometric metamerism.

Microstepping – Process of moving media through a printer in smaller-than-standard motions, which can improve *dot gain* and den-

sity when printing solid areas on film positives.

Mild-Solvent Inks – Also known as light-solvent inks. Similar to *solvent inks* in that they use cyclohexanone as a carrier, but in greatly reduce concentrations. Printers using mild-solvent inks emit fewer harmful VOCs than standard *solvent inks*.

Mirror – Reversing type or an image in a design. This is often used in digital imaging to make transfer prints that are applied backward to a material or backlit media that is viewed through the front.

Mobile Billboard – A billboard mounted on a truck or trailer that can become part of traffic flow, or remain parked at specific locations.

Moiré Pattern – An interference pattern created when two grids are unevenly spaced, conflicting or present overlapping angles. Visual artifacting occurs between the dots of the different *color separations* in *halftone* images.

Monomers – Chemical compound in *UV-curing inks* that undergoes the process of polymerization and is transformed from a liquid to a solid (*polymer*) state when exposed to UV radiation.

N

Network – Connection of computers with cables and software constant, on-demand communication. With a network, several computers can use or control software installed on a central computer, or *server*, dedicated to one or a few functions.

Non-Illuminated Panel – A billboard panel not equipped with lights. Also called a "regular".

O

On-Demand Color (ODC) – Term usually used in short-run color

printing. Processes include *inkjet*, *electrostatic* and direct-to-press.

Opacity – Measurement of the resistance to light passing through a substrate, on a scale of 0-100%, indicating the propensity for show-through of underlying type or images. This is computed by measuring the density of the substrate over a black background and over a white background.

OPI (Open Prepress Interface) – *PostScript* operations that allows for the use of low-*resolution* images as place holders during design and setup of a printing job, that inserts the actual high-*resolution* images when the job goes to output.

Optical Resolution – The maximum actual or “true”, *resolution* of a device without the use of *interpolation*.

Overlay – Paper strip pasted over a section of an existing poster, to show a price, a date, or other time-sensitive information. Used interchangeably with “snipe”.

Overprint – Standard in *process color*, the placement of one color over another to create varying tones and shades. Also used with individual *spot colors* to create other colors (as with Gerber Scientific’s *thermal-transfer Spectratone foils*).

Overprint White – Printing application in which white ink is used as a background for reverse-printed transparent stocks, such as back-lit images. White in this application should be somewhat translucent.

P

Page – Production area of a printer. Most plotters have a limit of page size along the Y axis (usually a few inches less than the width of the material) and the X axis (although most allow 1,000” or more). Also called a *panel*.

Panel – Division of a job based on the production area of a device,

such as a plotter or printer. If the job size exceeds the production area, different panels are set up by sign software, and can be produced by selecting individual panels. Also called *tiling*. Usually refers to a billboard face, but can also refer to a single sign structure.

Pass – Describes the travel of a *printhead* across media in inkjet printers with shuttling *printheads*. Each pass of the printhead increases color density and *resolution* of the image.

PANTONE® Matching System – Numbering system for identifying 3,000+ colors created through combinations of 14 *primary color* inks. The Pantone company produces numerous color-matching systems for standard print and computer applications.

PDF (Portable Document System) – Electronic document format from Adobe Systems Inc. that allows the distribution of files across platforms that can display a document as originally designed and formatted – and, when fully developed, also allow printing – without requiring the original software application or fonts on the viewing computer.

Permanent Bulletin – Advertisement or display that remains at one location for the entire term of the advertiser's contract.

Phase-Change Printer – Printer that uses ink loaded and kept in reservoirs as a solid, and then liquefied by heat for printing onto a substrate.

Photo YCC – Standard developed by Eastman Kodak Co. to define the *color space* for digital imaging in Photo CD and desktop publishing.

Piezo Inkjet – Inkjet *printhead* design using oscillations of electrically stimulated piezoelectric crystals to force ink through inkjet nozzles and onto substrates.

Pigment – A colorant that is suspended rather than dissolved in an *aqueous* ink vehicle. The opposite of a *dye*. Pigmented inks generally have greater outdoor durability and fade resistance than *dye*-based inks, but may not have as large a *color gamut*.

Pixel – A combination of the words “picture” and “element,” denoting the smallest part of a picture that can be located and placed as an element along the X and Y axes of a *bitmap* or on the computer screen. A pixel can be monochrome or up to the pixel depth available on your color system. Pixels are also used for identifying screen or print resolutions, e.g. 72 pixels square inch.

PPI (Pixels-Per-Inch) – A measurement of the number of *pixels* that will occur within the vertical and horizontal planes of a one inch areas in a *raster image*. The higher the number, the greater the *resolution* and maximum viewable size without *aliasing*.

Pixelization – Process that results when image *pixels* are simply enlarged to increase image size, resulting in a lower *PPI* without increase in detail, resulting in *jaggies* along diagonal edges.

Plug-Ins – Small, limited-purpose programs that work with and add capabilities to larger graphics applications.

PMT (Photomultiplier Tubes) – Light detectors used in drum scanners. PMTs usually accept four beams of light – one each for red, green and blue, plus one for image sharpness. Usually considered to be more sensitive and accurate than *CCD* by having greater *dynamic range*.

Pocket – Pockets are a finishing technique whereby the edges of the banner are turned around to the back-side of the vinyl, etc. and either welded or sewn so that there is an open "loop" at the edge(s) of the banner. This allows the banner to be suspended from the top sides, or held in place at the bottom. Pockets can be produced in different sizes depending on installation needs.

Pole Pockets – Similar to pockets but typically refer to the type of pocket used for billboards. They are usually 3" in depth, and are used by outdoor companies to literally insert a pole through, which is then secured to the structure using hooks and ratchet straps.

Polymer – Stable chemical compound or mixture of compounds consisting essentially of repeated structural units. *Monomer*-based

UV-curing inks, once cured, become a solid.

Posterization – Process of reducing the number of colors in an image. Used to aid in speeding the *RIP* process for solid-color images, it can greatly affect specific color integrity.

PostScript – Graphics language that creates *vector*-based images that, by computer code, allows for proportional scaling. It makes most scalable type and artwork possible for Windows- and Macintosh-based graphics software.

Preflighting – Process of checking a graphic file for potential problems before a sending it for final output, essentially to find font, color and other problems.

Primary Colors – Color that cannot be created by missing other color in the gamut of a given *color space*, but can be mixed to create other color combinations within the space, red, green, and blue (*RGB*) are additive primaries of emitted light, while cyan, magenta and yellow (*CMY*) are subtractive primaries of reflected light. Black (*K*) is added to *CMY* to produce denser, truer black images.

Printhead – The device in an inkjet printer that sprays droplets of ink onto the substrate. Printheads contain nozzles (grouped by color), and typically shuttles back and forth across the substrate as ink droplets are forced out on the nozzles.

Print On Demand – Term that applies to a variety of short-run publishing processes that include copier technologies and direct-to-press applications.

Process Color – Cyan, magenta, yellow and black (*CMYK*), combined in a matching system to recreate thousands of colors in offset and direct digital printing.

Q

Queen Size Bus Poster – Posters affixed to the sides of public buses with a copy area of 27" x 85".

Queue – Electronic holding area, usually in random-access memory (*RAM*) or on a hard drive, where data waits before being sent to a printer for output. Synonymous with *spooler*.

R

RAM (Random Access Memory) – The high-speed portion of a computer's data storage that is held on special chips for use in current applications procedures. RAM is said to be a volatile if the stored information is lost when power is disrupted.

RAS (Remote Access Server) – A *server* that allows access to various arranged computers through modems.

Raster Image – An image comprised of a collection of *pixels* arranged in a rectangular array. The image is displayed as a series of lines of dots, as opposed to 'vector image',

Rasterization – Translating data to a specific *bitmap* pattern for use by a digital printing device.

Real-Time – The concept of seeing actions on a computer screen as through the activity were happening at a natural pace. As in "real-time proofing".

Reflective – When referring to color, the ability of a surface to return some or all of the wavelengths of light that strike it.

Resampling – Changing the *resolution* of a *bitmap* image file without altering the image's physical size.

Resin Transfer – Method of creating a color using resin-based polymers on a donor sheet, called ribbon (or *Foil*), and printing to a substrate using the *thermal transfer* method. The resin colors are fused onto normally resilient materials such as vinyl, creating a more-

permanent image and waterfastness and UV protection.

Resize – Change of reproduction size. Files can generally be resized so prints can be made smaller or larger. Significant up-sizing often results in *jaggies*, but an adjustment of up to 20% is acceptable.

Resolution – The number of *pixels* or *samples* per inch in a device is capable of recognizing or producing, measured in horizontal columns (width) by vertical rows (height). Megapixels can be calculated by multiplying pixel-columns with pixel-rows. Resolution is a measure of the detail in an image; the higher the resolution the higher the amount of detail and the bigger the file size.

RGB (Red, Green and Blue) – The three *additive colors* used by monitors and scanners for transferring and representing color data. The rule of thumb in imaging is that input and display are in RGB, while output is done in *CMYK*. RGB is typically used in video display applications.

RIP (Raster Image Processor) – Software and/or hardware used to convert data to *bitmap* information for processing on a *PostScript* printer or other digital device. This computer-calculation-intensive process determines 360,000 combinations and color placements to print every square inch of a 300 *DPI* image using *CMYK process colors*. Each *process color* is a *color separation*. This action is referred to as *RIPing* or *Rasterization*.

S

Samples Per Inch – Unit of measure use to describe the input *resolution* of a device, such as a scanner or camera, in one-linear-inch increments. Each data point in a *RGB* capture includes separate red, green and blue calculations.

Sampling – A computer process that selects the best pieces of capture data for representation. While 24-bit scanners use sampling to select the eight most-accurate bits each of red, green and blue, 30-bit

scanners take the best 10 per color.

Saturation – The intensity of a specific *hue*, based on the color's purity, measured from 0-100% in the *HSV* color model. Highly saturated *hues* have vivid color, while less saturated *hues* appear grayish.

Scan – Process whereby a hard copy image, typically a photograph or other artwork, is electronically converted to a digital file using a scanner. This process captures the image, as well as the color characteristics of the original and allows the image to be inserted into electronic documents.

Screen Angles – In half-tone printing, the geometric intervals at which *halftone* screens are placed to eliminate the appearance of *moiré* on a print. Usually, these are back at 45 degrees, magenta at 75 degrees, yellow at 90 degrees and cyan at 105 degrees.

Screening – Method for positioning dots for reproduction of an image by a printer. The two basic methods are *halftone*, where dots of varying sizes are placed in an exact evenly spaced order; and *stochastic*, where small dots of the same size are placed in a random-looking variable-spaced distribution on an image. *Halftone* is also known as amplitude modulation (AM), and *stochastic* as frequency modulated (FM).

Secondary Color – A color made by mixing two primary colors in a given space.

Sequence – Order in which inks are deposited by a printing device. For example, *CMKY* inkjets use a sequence of yellow, magenta, cyan and black (Y/M/C/K) for actual printing.

Server – Computers used for limited tasks. In *networks*, servers may act as a hub for storing programs used by different workstation computers, and can act as the sole machine for *RIP* purposes in large-format color printing.

Shadow Point – The darkest and densest tone in an image that is not black; all tonal *values* beyond this threshold are black.

Sharpen – Process in imaging-editing software to improve contrast of tones within an image. This can be a universal (all tone) operation or target specific areas of an image.

Single-Pass Printing – *Inkjet* printing process that uses arrays of stationary *printhead* clusters (also called “color bars”) instead of a shuttling printhead. The substrate passes beneath printhead arrays in a single pass. Not yet commonly applied to wide format printing.

Snipe – Small added strip of paper or vinyl pasted over a section of a billboard advertisement, showing a price, a date, or other time-sensitive information; synonymous with overlay.

Solvent Inks – Inks that use a solvent, generally cyclohexanone, as a *carrier* and are commonly used for printing onto vinyl, as they offer good outdoor durability. Printers using solvent-based inks emit VOCs and should be ventilated.

Spectrophotometer – A color measurement device using the distinct wavelength (spectral) *values* of light to indicate a spectral reflectance, emittance or transmittance curve along the visible spectrum (380-720 nm). A more sophisticated device than a *colorimeter*.

Spooler – Area where data used in printing is held before going to the printing device. Can be a specific part of a computer’s random-access memory (*RAM*) or its hard drive. See *Queue*.

Spot Colors – Color tints used independently in a printed piece for a specific need (i.e., Coca-Cola’s shade of red), or in overlapping combinations (including those with *process colors*).

Spot White – An application in which white ink is used as an independent color (usually for printing text on a non-white surface).

Stochastic Screening – *Screening* process that conveys the tone of a screened image by varying the number and location of same-sized dots as opposed to varying the size of dots within rigid grid.

Substrate – In the billboard industry, the fabric or material on which an advertisement is printed. Common substrates are flexible vinyl,

canvas, mesh, paper and translucent materials.

Subtractive Colors – A reflective color system used in printing, in which the subtractive primaries, cyan, magenta and yellow (*CMY*), are used to create all other color. When *CMY* are combined at 100%, black is produced. Most printing systems use a separate black (*K*) pigment to reduce in cost.

Super King Bus Posters – Posters affixed to the sides of public buses with largest transit format: 30" x 240".

Support Files – Support files are elements such as pictures, fonts, color characteristics and graphics that are included in the final image.

SWOP (Specifications for Web Offset Printing) – Formulations of inks used in web-offset presses; inks following these standards form the basis for color-matching systems such as *Pantone*. Different components of *SWOP* inks, such as those with fluorescence, expand the color gamut beyond the effective range of many digital printers, however.

T

Tertiary Colors – Created by combining a *primary color* with an adjacent *secondary color*.

Thermal Inkjet – Inkjet *printhead* technology where inks are heated in a chamber located above the *printhead* to a temperature greater than the boiling point of the liquid. Heat changes the characteristics of the fluid, causing it to expand and be expelled through the *printhead* nozzle and onto the substrate. Sometimes called “bubble-jet.”

Thermal Transfer – Printing technology that uses heat to deposit *dyes* or *resins* from a donor sheet (often called *foil*) onto a receiver material.

Thermal Wax – Phase-change technology in which color are har-

bored in waxes and melted as needed for inkjet deposit on a receiver material.

TIFF (Tag Image File Format) – A document format developed by Aldus, Microsoft and leading scanner vendors as a standard for color or grayscale graphics, including scanned images. The quality of the image is determined by its DPI.

Titanium Dioxide (TiO₂) – Pigment used to make white inks (both *UV-curing* and *eco-solvent*). TiO₂ molecules are dense and heavy and have only recently been use in digital printing applications.

Tolerance – The amount of acceptable difference between a known standard and a measured sample.

Transit Advertising – Advertising media appearing on the exterior or interior of public transportation vehicles or stations (buses, trains, commuter rail, subways, platforms, terminals, etc.)

Transit Shelter Display – Advertising panels that are an integral part of a freestanding covered structure located at bus stops, usually with 24-hour illumination.

TURMATCH – Color matching system bearing the name of its developing company. They system uses *CMYK* color *values*.

U

UCR (Under Color Removal) – *Color separation* process in which black ink is used to replace cyan, magenta and yellow (*CMY*) in shadow areas where the three inks overlap, since black (K) in the combination of *CMY*. (Similar to *GCR*.)

Underbase White – Printing application in which a solid field of white ink that is laid down to be over-printed with and image, as when printing onto a non-white surface.

UV-curing – Printing process in which a lamp emitting ultra violet (UV) rays is used to transform *monomer*-based liquid inks (deposited onto a substrate) into *polymer*-based solid inks. Commonly used process in many digital flatbed printers.

V

Value – Indicates the lightness or darkness of a color in relation to a neutral gray scale. The *HSV* color model uses a scale of 0-100% representing pure white.

Vector Image – A computer image that used geometrical primitives (such as points, line, polygons and *Bezier curves*) to produce mathematical descriptions of paths for the graphic.

Viewing Booth – Enclosed area with controlled lighting that creates a stable environment for evaluation proofs and other printed materials and reduces the influence of *metamerism*.

Viscosity – The term used to describe the degree of fluidity of a liquid. Regarding inks, a high viscosity indicates a thicker ink; a low viscosity indicates a more fluid ink.

VOCs (Volatile Organic Compounds) – Petroleum-based chemical compounds with high vapor pressure and low water solubility (evaporate easily) commonly found in industrial solvents, including those used as *carriers* in *solvent*-based inks. VOCs are considered toxic, and airborne VOCs are federally regulated in some industries.

VRAM (Video Random Access Memory) – Storage chips in a computer that are devoted exclusively to the display of images on a monitor. Increased VRAM allows displays to redraw or refresh an image at closer intervals.

W

Walking – Process of changing the charge levels of the printing nibs of an *electrostatic printer*. Adjusting to a lesser charge level, or walking down, an *electrostatic printer* reduces dot gain with overlapping images while printing and enables better color matching.

Wall Bulletin – Large mural or display on the exterior wall of a building. Also called a wallscape.

Wax Transfer – Method of heating a colored wax material and printing it onto vinyl. The wax colors rest on the vinyl, creating a less-permanent image on the material.

White Point – The lightest tone discernable in an image; all *values* paler than this threshold appear as white.

Y

YCC – *Color space* developed by Eastman Kodak that defines colors by *luminance* (Y) and two levels of chrominance (C and C).

Z

Zip – To reduce file size by using compression algorithm programs such as PKZIP or WinZIP.

Zoom – Making an image or image part become larger (zooming in) or smaller (zooming out) as it appears on the monitor. A lens that changes magnification.

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