COLOUR MANAGEMENT

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Colour management has always been seen as a massively complex task. Accurate colour reproduction is not easily achieved on a computer or monitor. It is practically impossible to display on a monitor the exact colours of an image existing on paper. This is because colours on monitors and on paper are produced by entirely different physical phenomena.

Additive Colour

Colours on a monitor are produced by beams of light, this is referred to as :

ADDITIVE COLOUR

The primary colours are red, green and blue, (RGB) when all 3 are mixed together the result is white light. Monitors are often poor at accurately displaying certain colours such as warm yellows.

Colours on a printed sheet are referred to as:

SUBTRACTIVE COLOUR

The primary colours are cyan, yellow and magenta (CMYK), the 'K' is for black, when all 3 are mixed together the result is a very dark brown. Printing presses using ordinary commercial CMYK inks cannot easily print deep blues and deep reds, as they are outside the inks colour gamut.

Subtractive Colour

Up until 1993 all Colour Management Systems were produced by the manufacturers who had made the equipment. Most people who work in the prepress area used a combination of equipment from different manufacturers. Each piece of equipment uses a colour standard which may clash with another.

Finally in 1993 the leading prepress manufacturers - Adobe, Agfa, Apple, Fogra, Kodak, Microsoft, Silicon Graphics, Sun and Taligent - founded the International Colour Consortium (ICC) to create an open, vendor neutral, cross-platform standard for colour management.

The first result of the ICC initiative has been the creation and implementation of standards for describing colour characterisitics of different devices, known as ICC Colour Profiles. In order to maintain print predictabiliy, a device's colour space needs to be known as well as the compensation required to bring performance to the ideal. ICC profiles contain this information.

ICC-based colour management works in 3 ways:

- Colour management module (CMM) which resides in the computer's operating system and holds everything together.

- Profiles for each of the devices - input and output - that allow the system to turn what the scanners and camera see into a standard form and then turn these standards into a form that's right for the printers and presses.

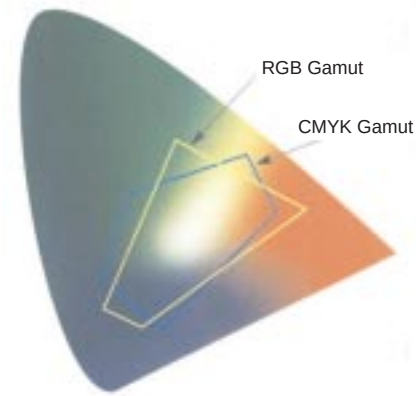
- Lastly there are drivers that allow the image-editing and layout applications to work with the standards.

Today most graphic arts manufacturers are developing applications which support ICC profiles. The software applications calls to the operating system when performing a colour transformation. The operating system (OS) in turn calls for a preferred colour matching module (CMM) to fulfil the request. If a preferred CMM is not available then the OS will call to a default CMM.

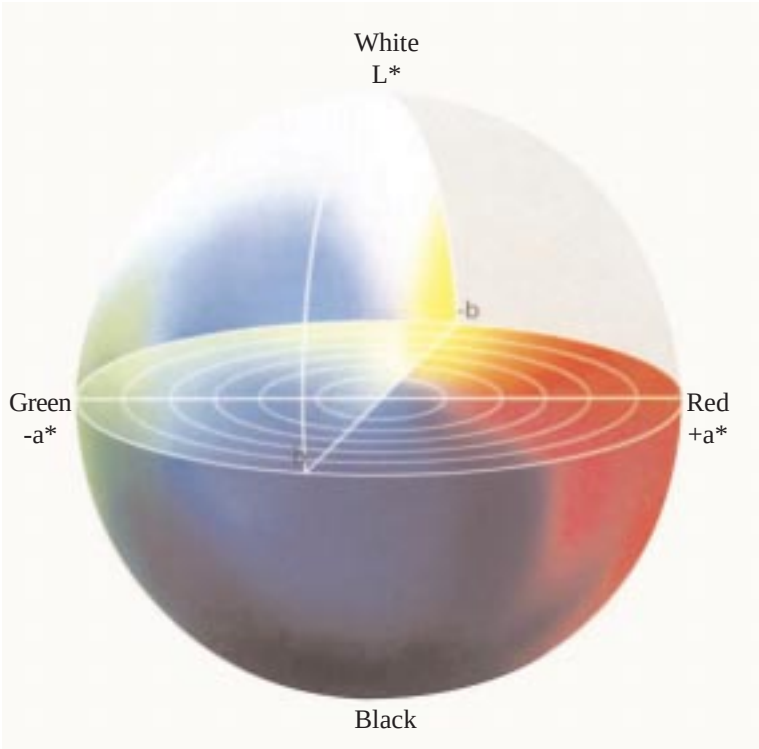
The following colour management is used on the 2 main operating systems:

- Macintosh: ColourSync
- Windows: ICM (Image Colour Management)

CMMs have access to a range of colours (colour space) known as CIELAB. This is a generic standard that represents the colours available to the majority of scanners, monitors, proofers and printers. CMMs also force colours that are out-of-gamut back in. Although this is not a perfect system, most professional product manufacturers make sure that their products deliver content that keeps within the boundaries of CIELAB. This model plots colour values on a horizontal scale, red to green and a vertical scale of blue to yellow.



The CIE colour model illustrates RGB and CMYK gamuts. It can be seen that the CMYK model has limited range of colours compared to RGB.



CIELAB Colour Space:
This is a generic standard that represents the colours available to the majority of scanners, monitors, proofers and printers

QUESTIONS ON COLOUR MANAGEMENT

(1) Why do colours on a monitor appear differently when printed?

(2) What are the primary additive colours?

(3) What are the primary subtractive colours?

(4) How was colour controlled before 1993?

(5) In 1993 the International Colour Consortium (ICC) was founded, who were the leading prepress manufacturers who were involved in this initiative?

(6) What is the term given to the creation an implementation of standards for describing colour characteristics of different devices?

(7) Give an example of where colour management can be found?

(8) What colour management is used on a Mac and a PC?

(9) Name the colour standard which most scanners, monitors and printers use, that makes sure that their products keep within a certain boundary?