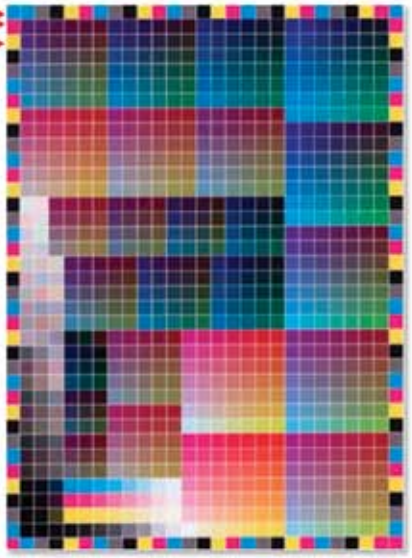
The 21st Century Color Matcher

1	A1	57.00	-39.20	-46.00
2	A2	50.00	76.00	-3.00
3	A3	91.00	-5.10	-95.00
4	A4	16.08	1.06	1.51
5	A5	70.41	1.32	59.43
6	A6	66.05	-26.77	-29.67
7	A7	20.80	-4.55	5.92
8	A8	49.62	23.89	44.51
9	A9	9.93	2.28	-0.24
10	A10	43.09	12.51	-4.75
11	A11	23.61	20.36	-32.29
12	A12	61.55	0.75	37.45
13	A13	58.51	-0.33	41.97
14	A14	17.43	-3.78	-26.48
15	A15	28.35	20.20	-44.00
16	A16	78.61	19.38	12.22
17	A17	12.03	0.18	-0.87
18	A18	49.28	-8.16	-33.67
19	A19	19.41	-22.74	4.94
20	A20	88.41	-9.34	90.88
21	A21	36.29	32.60	-7.27
22	A22	57.96	32.60	-5.26
23	A23	7.20	-14.02	-3.91
24	A24	48.22	2.88	27.77
25	A25	33.53	-5.34	-40.37



A subtle shift in our industry has occurred without most of us realizing it. The shift is the change in how a printing company manages color in their facility. This job was traditionally centered in the ink room, then slowly moved into the prepress department, and now it is making its way to the IT department — creating a new industry position I like to refer to as the "21st century color matcher."

This change is very evident at most graphic screen printing and at all inkjet printing facilities. It all started when the trend in graphic images moved toward more process color printing. There is a diminishing need out there for black and white or simple two-color graphic images. This is a trend that has prevailed in all of the commercial printing processes.

This trend alone has moved the art and technology of color control into the prepress department, where software allows prepress experts to manipulate and control the color images we print electronically. In this printing scenario, we want the ink on press to be a constant. The goal for the ideal press is a press that is loaded with an ink that prints the same way every time. It is not desirable for someone to be tinkering with the ink once it goes to press to manipulate the color of the image. Most screen printers now see the value of this method, whereas all inkjet printers think this way since changing the ink in the machine is a time-consuming process.

If you're in the business of selling color images, you want to take advantage of everything you can to make those images the best they can be with the tools you have available. This is why today's graphic imaging company needs a digital color manager.

This is where the progress is ending and there is no evidence that printers are prepared to move to what I believe will be the next level of color control. That is the level where color is controlled by the IT department, or more ideally, to persons with prepress, color theory and IT skills. It is the new and changing software products that are the driving force behind color control in the printing processes.

Questions for your company to consider:

- Are you ready to adapt to this next step?
- Do you have the talent on staff to do this work?
- Are you willing to dedicate the time to get your people trained?
- Do you know where to go to find someone to fill these positions in your company?

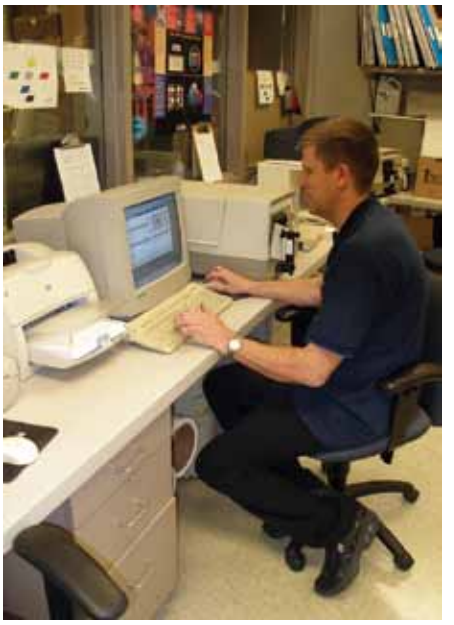
The Color Matchers

For many generations, the color in a printing facility was controlled by the color matcher. This person was the heart beat of a printing company. They were craftsmen and their craft was usually learned by osmosis. There was no formal education program for this position; it was a "learn by doing" program that usually took up to 10 years to master. These color matchers usually served as the color judge and jury. They could stop the press and production to adjust or change the color of the inks. They were the one-man QC Department, an ink and chemical expert — and

Bruce Ridge, Director of Technical Services, Nazdar Consulting Services

Traditional color matcher

Digital color manager



Digital Ink formulation system

Color can be controlled and predicted better than ever before; however, controlling it has become more complicated than we are willing to acknowledge.

Screen Ink formulation system

in many cases — the ink estimator and purchasing agent for a company.

What these traditional color matchers would rely on was their ability to match any color by eye. They would sometimes use a scale to document a formula or to measure out additives to a special ink mix. Ink inventory was managed by memory or written on three-inch by five-inch index cards and stored in a card file replicating a wacky Pantone version of the Dewey Decimal System.

Some of these color matchers moved into the world of instrumentation and a higher-level color control using formulation software. These few innovative color matchers learned to incorporate spectrophotometers to measure colors and feed that data into software that would generate color formulas. These formulation software programs were expensive and took time to learn; however, once set up they would generate accurate ink formulas and determine exact quantities of ink to mix for a specific job. Even more impressive is that they could help the color matcher work off inventories of previously matched inks that were left on the shelf from prior jobs. Many of these color formulation systems, along with training, were provided to printers by their ink suppliers.

During this same time, digital image creation became the primary method of generating artwork for printing. This facilitates the growth of full-color printing, which eventually leads to the reduction of spot-color printing and color matching. This change affected all of the printing processes and the prepress functions, so the different printing processes start to look very similar. Color is now being controlled in the art and prepress department. Process color becomes the dominant color reproduction method for graphic screen printing and is the dominate-method of color reproduction for wide-format inkjet printing.

There also are trends in the commercial printing world that are driving change in all of the print processes. These trends have been documented by SGIA and PIA/GATF for more than 10 years and are part of the reason that digital printing is the only growing printing process because they all favor some of the inherent characteristics of digital printing. These printing trends include:

- An increased use of process color
- Requirement for faster turnaround
- An increased requirement for fulfillment services
- Multiplatform printing companies
- Digital printing intrusion in most markets

These same forecasts list "digitalography" as the up and coming printing process. This is a broad term that encompasses many different digital printing processes. They also predict that inkjet will eventually become the dominant digital printing processes. This is good news for wide-format inkjet printers as well as suppliers to this segment of digitalography.

Digital color is color that is created, manipulated, and sent through a digital workflow of software and then finally printed by any of the commercial printing processes. This can be screen, offset lithography or inkjet. This is specific color

that has been translated into numbers (L*a*b*) manipulated with software, then translated back to color. This 'new' type of color matching requires a completely different understanding of color — it's color by the numbers. Understanding the math is as important as being able to see subtle differences in two red patches. Today's color matcher needs to understand how these numbers are captured with an instrument, how software compares these numbers, and how the software manipulates the numbers in order to translate those numbers back into a color. This is the work of the 21st century color matcher (CCM).

The 21st CCM does not mix ink, they are not chemical experts and most importantly, they do all they can to keep the press running. Instead of stopping the press to correct today's color, the 21st CCM would collect data from today's press run to make improvements for tomorrow's press runs. Their responsibilities are greater because the overall influence on the company is greater. In order to meet today's shorter deadlines on more complex color jobs, the stakes are much higher to deliver the right color in as few prints as possible.

The 21st CCM could also be called the digital color manager. This is a full-time job for larger companies, although few companies realize it. The prepress manager on a part-time basis currently attempts the work; and therefore, the work either never gets done or is done only half way. The most common scenario is for a company to own profiling software and hardware while running their day-to-day printing using one profile or configuration. This happens because no one is given the time to create individual media configurations.

If you're in the business of selling color images, you want to take advantage of everything you can to make those images the best they can be with the tools you have available. This is why today's graphic imaging company needs a digital color manager (DCM). If you are a smaller company and cannot afford a full-time DCM, then you need to rent one. Just in the same way you would rent payroll services, tax and accounting services, and IT services.

Why is digital color management such a critical position? Color can be controlled and predicted better than ever before; however, controlling it has become more complicated than we are willing to acknowledge. Software is updated every year, computers become more powerful, and new products enter the market every month that can improve workflow and efficiency. Who in your company is taking the time and has the expertise to evaluate which of these products are best for your company? If your resident color expert is constantly focused on production, they are not managing your color — they are trying to get work out the door.

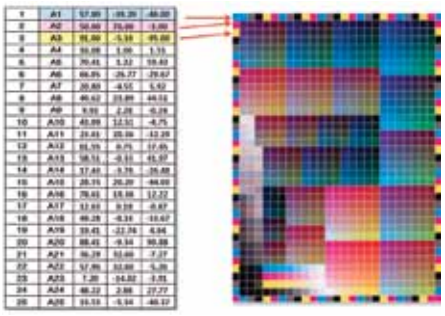
This position of the DCM is critical to your company and there are several skillsets this person should have. The ideal candidate would possess many of the following characteristics:

- Ability to communicate effectively
- Ability to provide training to all levels of knowledge
- Ability to focus on specific problems
- Ability to network to find solutions
- Ability to recognize new ideas
- Ability to multitask and complete tasks in an organized and systematic fashion
- Ability to know how to document procedures

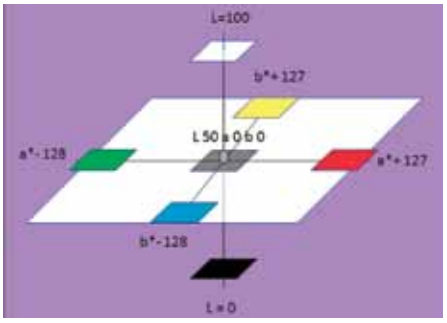
The technical requirements for the digital color manger are:

- Understands the principles of additive RGB and subtractive color CMYK
- Knows L*a*b* color space, spectrophotometry and densitometery
- Knows how to use rendering intent, color targets and ISO specifications

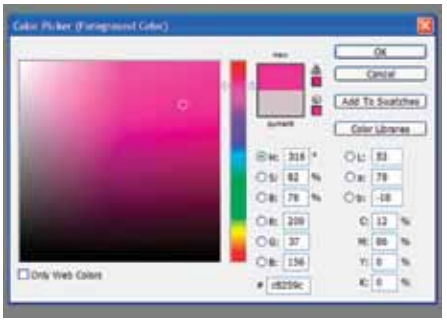
The new and changing software products are the driving force behind color control in the printing processes.



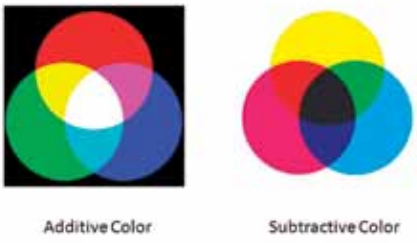
From color to LAB



LAB color diagram



Color Picker Screen Capture



Color Theory

- Is trained in G7® color control methodology
- Can work with the limitations of the inks and substrates they have
- Has a fundamental understanding of all of the print processes

The IT requirements of the digital color manger are:

- Has a broad knowledge of prepress, business and workflow software programs
- Is a master of the media configuration process and editing
- Knows the curve process for non-digital printing
- Can establish workflow procedures

In general, many of these skills are not learned through the osmosis process. These skills are learned through structured training and educational programs. Structured training has not been the primary method of learning for the experts in the screen printing and wide-format inkjet industry. Our industry has relied on getting skilled employees by either hiring someone from another company or by providing on-the-job training so they can learn during production. This may have worked with the traditional color matching person over a five-year period, but it is not effective when trying to develop a DCM with up-to-date expertise.

This position now requires our industry to do something they have not done in the past — hire people who have attended colleges and technical schools with graphic arts programs. Very few of these programs will teach students the specifics they need to know about wide-format and screen prepress and color control. They will deliver a person that has a foundation in prepress art, design, and workflow software as well as knowledge of color theory. This will usually be focused around offset lithography printing; however, the prepress aspects apply to our processes. From that point, you would be responsible for providing information about wide-format imaging and ensuring they stay up-to-date on the process through webcasts, seminars, trade shows and networking opportunities. This is an investment and it would be smart to protect your investment with a contract.

Benefits from Developing or Hiring a Digital Color Manager

There are many benefits a company can gain from developing or renting a DCM, including:

- A person assigned and given necessary time to improve color, will improve color.
- There are proven products available on the market that save ink, time and to reduce waste if managed by someone.
- New products and processes will keep a company competitive.
- Providing new solutions and processes attracts new customers.
- Smart innovative people like to work in innovative environments instead of with smart innovative people.

In summary, there has been a major change in the way color is controlled in a printing facility. This change has been driven by the printing trends that are a result of what is now possible because of developments in digital printing and in digital prepress color control. This has moved color control out of the printing shop and into the prepress and IT areas, and all of this requires a new type of person to fill the position of the digital color manager. This also requires a new mentality on the part of production-focused management in order to stay competitive in the delivery of cost-effective color images and digital color management. This will be critical to the success of a printing business that is focused on delivering full-color images to their clients.

Bruce Ridge is Director of Technical Services at Nazdar Consulting Services. He has worked in product management, product training and sales. Ridge began and facilitated the Masterprint Color Training Program, which has been presented to more than 2,500 printers in North America. He now manages the Nazdar Ink Division's Technical Service Department where the focus is to provide worldwide technical support for the Nazdar inks made for screen, inkjet and narrow web flexography printing. He is a frequent speaker at industry events and is a member of the Academy of Screen Printing Technology.

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