

# AM, FM & In Between

## Tuning Your Screening Dial

*No single screening technology will work for every situation and every image we attempt to reproduce. While there are images that benefit from enhancements screening technologies offer, some just don't.*

BY BRYAN HUGHES

**N**ot every song—or every type of music, for that matter—is right for every occasion. The deep thump, thump of the drum and the razor sharpness of an electric guitar serve a very different purpose than a lightly plucked harp or a smooth violin. Just as we all scan the AM and FM dials for just the right song, printers and pre-press operators often scan the AM and FM offerings (and all that's in between) when it comes to screening.

Despite what many manufacturers claim, there's no single screening technology that will work for every situation and every image we attempt to reproduce. While there are many images that benefit from the enhancements that screening technologies offer, some just don't. Some screenings will greatly improve the detail in the wood grain pattern of fine furniture or the metallic color of a sports car or the colorful detail of a beautiful dress, but those same screenings may not be best for flesh tone reproduction or flat tints. Stochastic screening in particular can have a grainy appearance in flat tints.

In addition to considering the appropriateness of each image for a particular screening technology, you must also consider what it takes to implement and operate that screening technology and how it might affect the processes you already have in place.

### What's Our Goal?

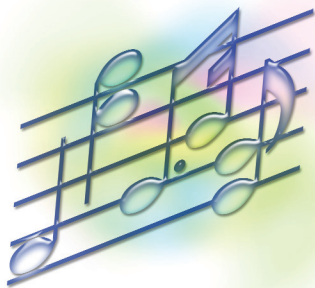
The goal of any screening technology, of course, is to make the image as close to continuous tone as possible. When alternative screenings like stochastic were first introduced, the industry was presented with a

good news/bad news type of scenario. The good news was that the “continuous tone” look was better than ever before. The bad news was that the process often made jobs extremely difficult to produce through the print process. The more “noise” (visible grainy appearance) that was removed, the harder the job was to print. Not to mention all of the associated film and platemaking issues of the “pre-CTP” world.

Through the years, a number of new screening technologies have been presented to the market. There have been advances and improvements, but, no matter which technology you choose, you're left with a balancing act. How much can you improve the quality of your printing versus what it might cost you in terms of process control throughout your operation. There are three main goals for any screening technology:

- ▶ Make it appear as close to continuous tone as possible;
- ▶ Eliminate as much of the inherent noise and moiré as possible; and
- ▶ Maintain printability.

While there are a number of screening technologies on the market today, there is one thing that remains constant. No matter what we do, we're still subject to the physical laws of transferring ink to paper. Printers generate revenue by running their presses. They spend tremendous resources, both human and capital, maintaining consistency, improving quality and streamlining their processes to produce more work in less time. As such, we need to be sensitive to what effect we're having on the overall process.



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Photo: Robert Lerich, Dreamstime.com

### Understanding the AM, FM Dial

To get a better understanding of what's available and what the best solution is for you, we first need to take a close look at each type of screening and really understand how each works.

**AM Screening:** Amplitude modulated (also known as conventional screening) originated in the early 1880s and is dependent on the size ("amplitude") of the dots. With this type of screening, it is the size of the dots that is modulated or altered on a grid to create the illusion of different tones. The dots are arranged along lines in both directions, forming a grid.

There are a number of issues that are inherent with conventional screening, including loss of detail, subject moiré, screening moiré, rosette visibility and optical bump. As screening technologies advanced, they aimed to eliminate one or more of these issues.

**FM Screening:** The other side of the "dial" is frequency modulated (FM) screening, in which the size of the dot remains the same, but the number ("frequency") varies. FM screening uses pseudo-randomly placed dots instead of aligning them along fixed screen angles to avoid causing visual artifacts. In FM screening, the pseudo-random arrangement of the dots means that there is no direction to the screen, and therefore no screen angle. The result is that FM screening can overcome many of the reproduction problems associated with AM screening.

With second order FM screens (the latest advancement in FM), FM-spaced dots are designed to grow in size through the tone scale in a fashion similar to AM dot structure. This typically occurs between the

quartertones and three-quarter tones. Dots may grow in length, area, shape or a combination of those, depending on the specific screen design.

Along with those advantages, however, are some corresponding disadvantages. The opposing side of the balancing act, so to speak. Flat tint reproduction can have a grainy appearance. Smooth transitions from midtone to shadow can be difficult to maintain. One advantage of stochastic screening is its ability to remain stable during the run. However, this can also be a disadvantage if your customer or pressman feels they need to make color adjustments to achieve a better piece. You cannot simply increase or decrease color as easily as with conventional screening technologies. This means plate curve adjustments and new plate/plates need to be made.

**AM Alternatives:** As our quest for the continuous tone look led us down the stochastic pathway, no one stopped to ask the question, "Can we improve the conventional screening algorithms to improve the process?"

This technology is the result of creating a modern algorithm, which allows higher line screen printing, but with far less compression of the process control window as with stochastic.

**Hybrids:** Screenings that don't follow the classic AM or FM methodology are generally referred to as a "hybrid" technology. There are two types of hybrids: "second order FM screens" and "hybrid AM screens."

These technologies take advantage of both FM and AM screening, combining them together to produce the desired result. Users will see FM screening in the highlights and shadow areas, while AM screening takes over from the 1/4 tones to the 3/4 tones.

## Putting Them to Work

Now that we've defined each type of screening, it's important to also identify and define the other factors to consider when you're contemplating implementing a new screening technology.

As you know, there are a number of issues that must be considered when making any kind of change to your overall printing process:

**What screening is best?** That depends on the goal of each individual user.

▶Subject matter is always a factor. As we've seen, different screenings have different advantages.

▶How easy is it to use?

▶What are the customer and marketplace influences affecting your business?

▶Can it solve a problem or improve a process? For example, if you need to go to 5-, 6-, or 7-color printing, what screening technologies will work?

**Screening "hot points"** Manufacturers talk about the many advantages of their screening offering, but what do they really mean?

▶Increased quality—what does this mean? What are they comparing it to? Is there a benchmark?

▶Better detail—Better than what? What do you, as the end user, consider as "better"? FM screening delivers more detail compared to AM; hybrids give smoother transitions. Which of these is "better"?

▶Registration is not as critical—What about edge detail or the gray balance? Do customers really want a printer that prints out of register?

▶Improved color stability on press—Again, "improved" compared to what? Different dot sizes and shapes respond differently on press. Additionally, color stability depends on a number of products that don't have anything to do with screening, including mechanical issues or a change in inks, blankets or other products.

▶Faster makeready—You hear that you'll no longer have to worry about moiré, that registration isn't an issue and that you'll get quicker customer approval. But, beware! These issues don't necessarily go away to give you a faster makeready.

### Screening considerations

▶Can your prepress department handle a new screening technology?

▶What about your infrastructure, including networks and servers? Will it add to your processing time?

▶Can your current platesetter and plates work with a new screening technology?

▶In the pressroom, you're likely to see higher dot

gain. Can you control that with your current products?

▶Can your pressroom products and equipment work in high resolution?

▶Have you maintained your equipment? Devices and machines that are not maintained well won't perform well either.

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### Screening implementation

▶Have you implemented some sort of process control procedures? It's more beneficial to have done this prior to implementing a new screening technology. No matter what screening you decide to adopt, if you don't implement it correctly, it won't work.

▶Smaller dots are more difficult to reproduce, so you must have your processes under control to do it well.

▶Custom curves may be necessary; do you know how to make the proper adjustments?

▶Will you need to make changes to current products? It's crucial to measure and benchmark your processes in order to know what's been successful and what's not.

▶Be sure to have control of your process. Prevent problems by being proactive and constantly monitor and troubleshoot any potential issues.

## It's All About the Process

While we've long considered the operation of a press a "craft," we now have to shift our thinking a bit and also think of it as a "process." A process that can be repeated, no matter if it's 7 a.m. or 7 p.m. or who's working on the crew.

If you're considering implementing screening into your workflow, take a close look at your current processes and try to anticipate any possible ramifications. Talk to your colleagues who've already taken this step and talk to your sales reps. Ask for samples, ask for advice and ask them the questions we've listed above. If you do your homework, you might just discover a new revenue stream or a way to differentiate yourself from your competitors—and that will have you singing a whole new tune. 