Calibration: How it Affects Colour Management

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What Are We Talking About?

- Calibration
- Linearization?
- Differing types
- Many use in-RIP / default
- G7
  - A calibration technique
A Bit About G7

• Each channel of CMYK adjusted to a dynamically-calculated curve shape
  • 0-50% shape very similar between devices
  • 50-100% scales to the maximum density of the channel
  • Dynamic with dynamic range of the press = essential
  • No density limiting, no gamut shrinking

• CMY channels then gray balanced
  • Gray balance is a very good thing
  • “Normalizes” the center of the color space, significantly reducing the effect of differing colorants
Benefits of Stable Calibration

• Why bother with a consistent tone curve in the highlights?
• Why bother with a standardized calibration at all?

• Profiling targets sample better when used on a calibrated system
• A well calibrated system usually varies more predictably
• It’s more easily / quickly brought back to the calibrated state with fewer patches being read
• Preserves carefully built ICC profiles
Benefits of Stable Calibration

• It's much easier to move jobs between (similar) presses when they calibrated in the same manner

• Calibration should not to be confused with color spaces
  • G7 ≠ GRACoL, though GRACoL is based on G7
Is G7 is in conflict with colour management?

No! Quite the opposite

Calibration provides the foundation on which effective colour management is built
New G7 Master Certification Levels

Grayscale
Targeted
Colorsace

Certifiable..... or not
• depends on the industry
• some companies keep it a trade secret
Re-profiling (4D / 3D characterization) can be overkill

• Over, as in:
  • oversampling, wasting time, and over engineering
  • applying more fix than is necessary
  • Conditions that affect 3D problems may be better addressed in other ways or with greater sampling

• Kill, as in:
  • killing productivity and
  • possibly affecting gamut shape and color matches using insufficient data.

Re-profiling tendency is for smaller targets and fewer of them

• risky.....
• It can work, with very effective modeling
Re-Profiling

• With smaller targets and fewer of them
  • Measurement errors could create serious problems that are difficult to detect

• Curve adjustments:
  • Tend to have better sampling frequency
  • Errors are easier to detect
  • Also address the roots of most printing variation
    • (though ink trap issues have to be considered).
Re-Profiling

• A good analogy is in Orienteering:
  • Determining the goal and route off the trail.
  • Quick checks of the compass while on the trail are effective
  • Unwise to reroute your hike around a hazard without considering the implications

• Lastly, Re-profiling can mask equipment maintenance and failure issues
  • Press becomes more unstable
  • Unexpected failure point causes longer downtime.
  • We’ve seen dE value of 5 and higher between subsequent digital press sheets.
  • Detection of such a problem and correction through maintenance and consumables replacement is the only way to correct such things
Progress in the Field

- G7 is reaching into unexpected industry segments, e.g., Inkjet
  - Production inkjet RIPs are notorious for cookie-cutter calibration that marginally improves results
  - Consultants in the inkjet world often have their "secret sauce" calibrations

- Dye Sublimation
  - Unique and interesting process printing to a transfer material, heat sublimating onto/into final products
  - Over-inking challenges, non-neutral K challenges
  - G7 tone curve and gray balancing actually increased the gamut
What About Spot Color?

• Non-CMY inks don’t align with density filters well
• Numerous techniques over the years
  • “Just Pick One” matching an existing filter to the ink
  • “Max Lambda” $\lambda$
    • based on a single spectral band with greatest absorption
    • but which one?
  • How to pick the best tone value calc..?
• And now....
SCTV?
SCTV!

- Spot Colour Tone Value
- L*-like, calculated for each of XY & Z
- Linear enough for calibration / linearization
- Ratified in ISO 20654-2016
- Implemented in newest cal tools like Curve4
- Combining G7 for CMYK and SCTV for spot channels is an effective and repeatable calibration strategy.
I’m a profiler. How did I get to this point?

• We’re nearing 1/4 billion measurements in our Maxwell system.

• We’ve helped bring ICC profiling and G7 into all major print segments.

• We’ve seen the results & heard the praise.
THANKS FOR LISTENING

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