

X-Rite i1Pro 2 review by Andrew Rodney

Coke or Pepsi? Paper or plastic? UV cut or UV included? For those of us who must use a Spectrophotometer to create ICC printer profiles, having to decide whether to measure with, or exclude the UV component has been debated for years. When purchasing an affordable Spectrophotometer, the options between the two measurement modes have been largely unavailable until now. Thanks to the release of the new X-Rite i1Pro 2 hardware this is no longer the case. There is more to this new instrument and software than just the ability to measure in a dual UV mode, however, with the introduction of the i1Pro 2, photographers no longer have to settle for one type of measurement mode when building their printer profiles.

OBA's, UV Cut, UV Included.

Before going into details about the new i1Pro 2, an introduction to the issues of UV (Ultra Violet) light and OBA's (Optical Brightening Agents) is warranted. Because many paper manufacturers want to make their papers appear brighter and whiter, they introduce OBA's, into the formulation. OBA's produce the effect of fluorescence by absorbing ultraviolet (UV) wavelengths, and then emit mostly blue light in the visible spectrum. To our eyes, the papers appear whiter but to a measurement device, a blue bias in the measurement data can result. That is important to recognize because the instruments used to measure a paper has a light source. Additionally, when viewing these prints, there will be yet another light source at play. Do either of these light sources contain UV? How we perceive color will vary depending on the OBA's in papers and the UV content of the viewing illuminant.

In simple terms, the introduction of OBA's may produce color issues when one measures the paper to build a printer profile. Does the instrument record this UV or does the instrument filter (cut/exclude) the UV? The discontinued GretagMacbeth Spectrolino had provisions to measure with, or without a UV filter that could be attached to the measurement head. The X-Rite iSis has the ability to measure UV or remove that component from the measured data thanks to the use of a dual illuminant inside the unit. Both devices are expensive. For those in the market for an affordable Spectrophotometer the choice was limited to either a UV Cut or Non-Cut product if there was even an option.

The "M" specification.

Because of these issues with OBA's, a new illumination nomenclature and standard has been introduced. This is known as the "M" series of measurement illumination conditions. Traditionally, Spectrophotometers used tungsten light sources and an assumption that specified D50 for the print proofing viewing conditions. OBA's were not a concern and were rarely found in prepress. With more paper options becoming available, many with high OBA's, plus differing color measuring instrument light sources such as LEDs, these old assumptions needed to change. The ISO incorporated specifications to define the measurement conditions of instruments and this language is seen in the X-Rite i1Profiler software when

measuring profile targets. The new “M” series specification needs to be relearned for those of us who defined the conditions as simply *UV Cut (UV Excluded)* or *UV Included*. These M conditions are labeled as M0 through M3.

M0 is the specification for legacy measurement devices using a tungsten-like lamp conforming closely to Standard Illuminant A. M0 doesn't fully define the measurement illuminant or UV content. Think of M0 as the old *UV Included* label. The behavior is that of the older i1Pro Spectrophotometer with no filter as well as older hand held Spectrophotometers that have been used in graphic arts for many years. Therefore, M0 is a category best suited to define instruments that don't conform to the other M series specifications that follow.

M1 specifies that the instrument light source emulate the Spectral Power Distribution of D50. The i1Pro 2 has two "UV-included" light sources: the Tungsten bulb and the UV-LED. Using both of these in a dual scan mode, the instrument can report M1. With the 2nd LED-UV measurement and a transform, the spectral response better represents color under D50, including the UV portion of the D50 spectrum. Part of the specification deals with the instrument illumination and reduces variations between instruments. Further, the M1 spec takes into account papers with OBAs. Due to the D50 illumination, UV has a strong effect from the OBAs found in many papers. M1 takes the D50 viewing conditions for light booths that conform to ISO 3664:2009 into consideration, and the output viewing conditions are more accurate when using such print proof viewing conditions. Think of this as the old *UV Included* mode like M0, however, UV content is now well defined and similar to the viewing standard. With the new i1Pro 2 used in i1Profiler software, M1 is the preferred setting when UV included data is desired – the exception may be if you have to match numbers from a printing specification established with an M0 instrument.

M2 defines how to measure using papers with what we used to call *UV Excluded, UV Cut* or no effect from the OBAs. The spec also defines this method so various manufacturers can conform to a standard procedure of UV exclusion.

Lastly, (and not something many of us will encounter) is M3, which is M2 with the addition of polarization.

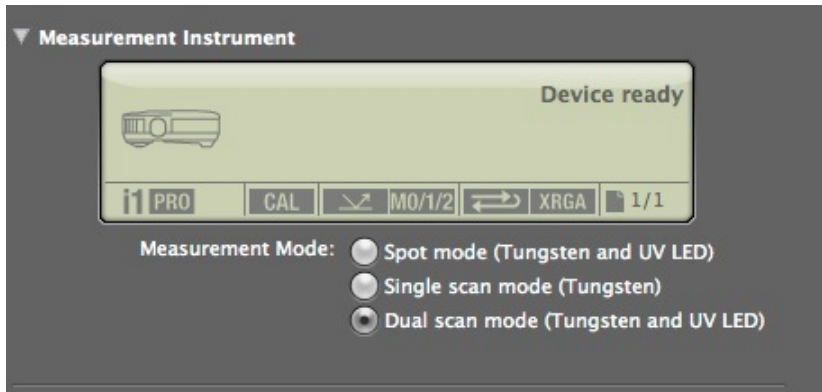
i1Pro 2 and the M series options.

In terms of what is shown and available in the i1Profiler software, (depending on the instrument):

M0 (No Filter, UV-included)-single pass with i1Pro 2

M1 (No Filter, D50 UV-included)-dual pass with i1Pro 2

M2 (UV cut, UV-excluded)-dual pass with i1Pro 2



The i1Pro 2 can capture all three of the above M series data. As mentioned, the i1Pro 2 uses a tungsten lamp as well as a UV LED, which are used during the measurement pass to produce the desired M series data. A single pass for i1Pro 2 includes the Type-A UV spectrum, making it M0 (versus M2 single-pass on iSis). The i1Pro 2 produces M1 or M2 because of the data captured with the UV LED, which is used to transform the single, pass M0 data into M1 or M2. Pretty clever! With newer instruments like the iSis and now the i1Pro 2, customers can select whether to measure UV included, exclude or produce both sets of data. There really is no clear-cut answer whether to include or exclude the UV or for that matter how much UV might be present in a paper until someone actually measures it. Having the ability to measure both ways, build two profiles and then inspect the output under differing illuminations is the best approach to dealing with OBA's in my opinion.

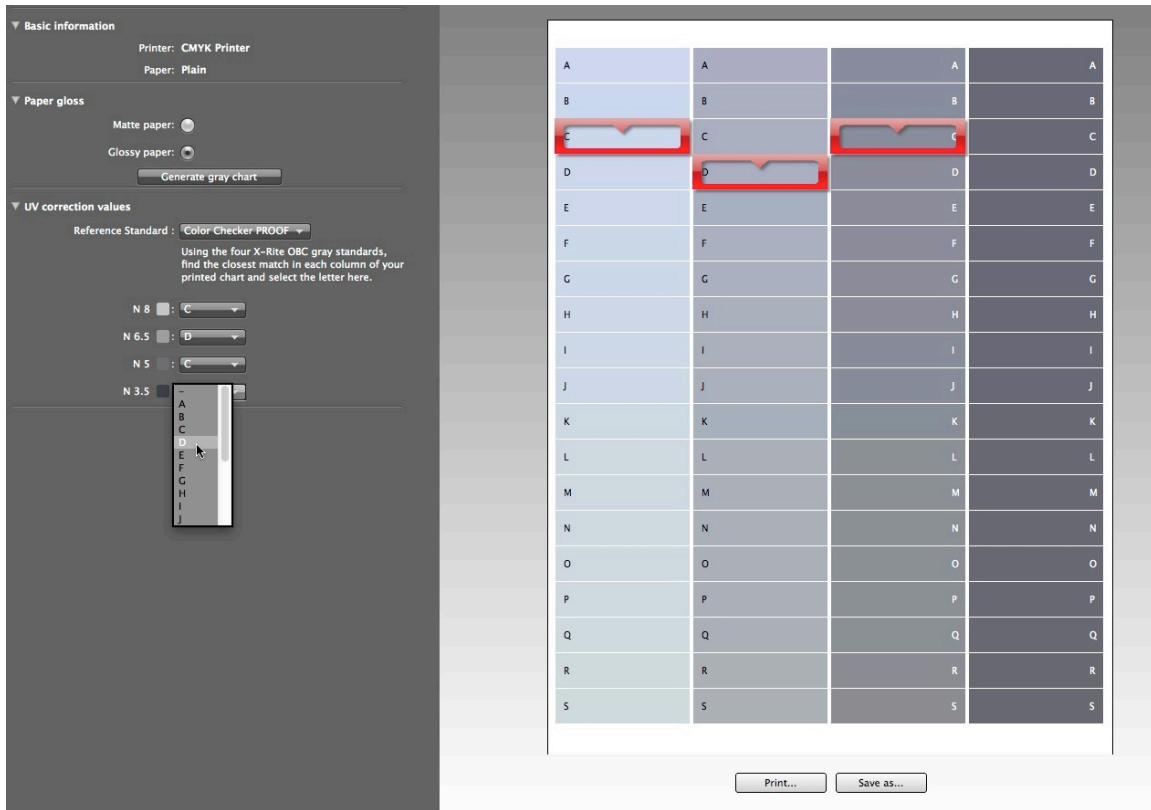
Updated i1Pro 2 hardware with LED indicators.

Keeping track of the i1Pro 2's status is easy thanks to colored LED indicators on the top of the unit. In standby and ready mode, the instrument indicators glow white. Because the tungsten bulb needs to warm up, this LED lets you know when the unit is ready to measure. Upon a successful measurement, the LEDs flash green. There are several combinations of red flashes to indicate errors, such as when patches in a row are not recognized, measurements are made prior to warm up of the lamp, or if the wrong row was measured. When scanning in a dual mode, a blue LED indicates that the first pass was successful and the unit is ready for the 2nd pass of the same row. This visual feedback aids in measuring targets without the need to reference the software on-screen. In addition, the new scanning board hardware is far superior to the original i1Pro scanning board in both rigidity and ease of scanning thanks in part to the aluminum ruler. A new floating guide rail mechanism aids in scanning a substrate that isn't smooth. The i1Pro 2 fits into the carrier much better than the original unit and scanning errors are rare. Depending on scanning speed, the i1Pro 2 scans 200 measurements per second providing a lot of averaged measured data per patch. In the original i1Pro instrument, some of the patch measurements are used to detect where the instrument is on the target. However, with the new detection mode in i1Pro 2, all 200 measurements are used for this data averaging. The minimum patch size for the i1Pro 2 is smaller than the original unit: 7mm instead of 10mm. For example, 400 patches for the i1Pro took up 27 rows

while the same number for the i1Pro 2 took up only 17. This means less paper and ink waste or the option to build more patches on the same sized paper. X-Rite will also release a new i1i0 2nd generation table that will support the new instrument as well as the original i1Pro. The i1Pro 2 was designed to work with legacy software that supports the original i1Pro SDK's in a compatibility mode. Newer functionality unique to the i1Pro 2, like M Series or small patch sizes will not be supported in this mode.

The Swiss Army Knife of Spectrophotometers.

Like the original i1Pro, the i1Pro 2 can be used for spot measurements. It comes with an accessory that clips into the unit for this task however you must calibrate the unit before attaching this accessory. Calibration takes place much like the original i1Pro unit, with a base that contains a white reference tile. This tile is larger for better calibration precision and is found under a protective slider, which keeps it clean. If you forget to pull it in the open position, the software will pop a calibration error. The white LED status indicates when the unit has been calibrated. The i1Pro 2 can also be mounted to an accessory for display calibration and X-Rite has again refined this harness and counterweight compared to the original i1Pro. Lastly, a new projector mount is provided in the package. This hardware is much better designed than the older 'Beamer' unit used to calibrate projectors with the original i1Pro. The hardware is smaller, lighter yet very stable and has a tripod mount on the bottom. Positioning the i1Pro 2 to measure a projector screen is easier and more precise with the new holder. The ambient light head is stored in this new projector mount, and is attached to the head of the Spectrophotometer much like the original i1Pro. Unfortunately i1Profiler needs a bit more functionality to take advantage of measured ambient light data. While the original i1Share software had the strangest user interfaces in the history of color management, it was powerful and provided a lot of data about the measured light data. However, i1Profiler does provide enough ambient light functionality to include this data into an output profile and to graph it's SPD.



In Conclusion.

In virtually every aspect, the new i1Pro 2 is a superior product compared to its predecessor. It provides more measuring functionality due to the dual illuminant design, it is easier to use and provides excellent user feedback thanks to the LED indicators. The OBC module provides an excellent solution for those who have to deal with high OBA papers under controlled viewing conditions. Based on my testing, the measurement data correlates better with data measured on my iSis Rev E than the original i1Pro. The iSis is my preferred instrument for building printer profiles, due to it being an automatic measuring device. The optional i1i0 scanning table will address that limitation. Even with an iSis, I can't be without an i1Pro in my tool chest. I routinely need the ability to measure spot colors, ambient light and calibrate projectors. The i1Pro 2 made excellent quality printer profiles and I would not hesitate to use the unit for this and other tasks when on location or in the studio. Check the X-Rite web site for pricing and upgrade discounts for i1Pro 1 users.

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