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# SCANNER AUTO-DIAGNOSTIC PROCEDURE

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# *Scanner auto-diagnostic procedure*

**Abstract**

Currently, multifunction printers have an integrated 2D scanner. This scanner is used to perform several functions such as scan, scan&copy, CLC calibration, etc. In some products, these scanners are composed by several modules. These modules may deteriorate or break during the life of the printer so they are not valid or optimal for the aforementioned functions. In the present disclosure, it is presented a method to diagnose a malfunction of one or more of the scanner modules and to perform a calibration to correct them if possible.

## 1. Introduction

In the case of doing an operation that requires the scanner, presenting a defective module, the results will not be optimal and the process may even fail in the case of a calibration. This results in a poor user experience and sub-optimal printer performance.

Currently, there is no automatic diagnosis of the scanner status, and the customer has to indirectly assess whether the scanner is functioning correctly.

In the case of calibrations such as the CLC for Page Wide XL Pro, which are a black box for the user, this is not possible. Therefore, in the case of a dirty or defective module, the user wouldn't notice it unless the calibration fails due to out-of-threshold results.

## 2. Description

In this section it is described an automatic process to diagnose the correct operation of the scanner modules of a multifunction printer.

The steps are as follows:

1. The diagnostic plot is composed by patch ramps of different ink densities for each of the printer's primary colors. These ramps are repeated on the plot to be scanned by each of the modules. Figure 1 shows a possible design of such a plot (in this case for the current 5-module PageWide scanner).

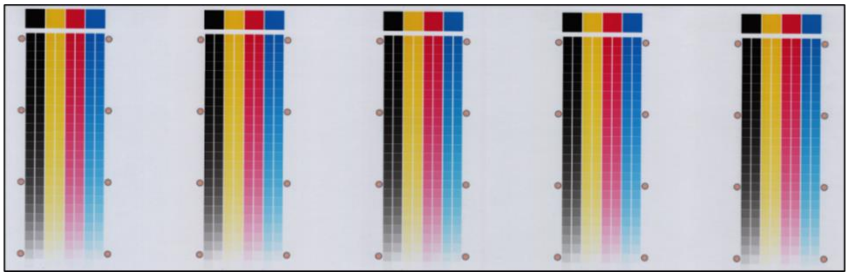

Figure 1 - Proposed diagnostic plot

2. The proposed target plot is printed in the factory and values for each colorant and ink density are stored in the printer NVM. These values will be used in the present diagnosis as reference values, representing a state of correct operation of the modules.
3. When the end user wants to perform a diagnostic, the target plot is printed.
4. After that, the user inserts the printed plot into the scanner.
5. Using fiducial patterns, the ROI (region of interest) of the color ramps is selected and the signal is acquired from the scanner.

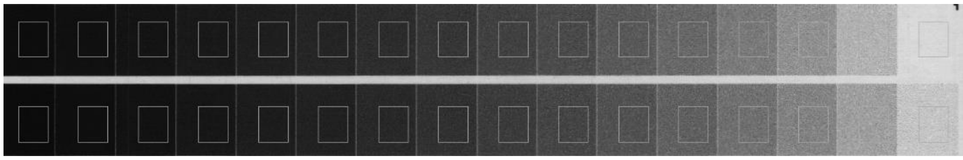

Figure 2 – Color ramp extracted ROIs of patches

6. The difference of the measurements for each module with respect to the reference values is calculated.
7. A verdict is given for each of the scanner modules based on pre-configured thresholds.
8. Necessary calibrations are performed as S2L recalibration of a defective module.

## 3. Conclusion

In this article we have described a method to diagnose a malfunction of one or more scanner modules and to perform a calibration to correct them. This is translated into preventive maintenance and less troubleshooting and debugging in case of scanner malfunction. Finally this supposes the deliverance of optimal system performance and image quality.

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