Clarification of Marker Life Count with respect to Color Printing.

Author: Harry Lewis

IBM Printing Systems
E: <harryl@vnet.ibm.com>
Version: 0.1
File Name: MARKCNT.DOC

INTRODUCTION

There are many types of marker technologies with several different configurations used in color printing. While not exhaustive, here is a sample of technologies:

1. High-end color with multiple EP "stations" operating simultaneously at all times.

2. Mid-range EP where Color = 4x; Monochrome = 1x turns of the drum.

3. 4 color Ink jet with 4 separate markers.

4. 4 color Ink jet with 2 markers - both involved in color printing.

5. 3 color Ink jet with 2 markers - one involved in color printing.

This diverse collection of color marking technologies leads to the need for a better understanding of how the Printer MIB should be used to track Life and Power-On count for the marker.

BACKGROUND

The standard Printer MIB (RFC1759) provides a Marker Group with a Marker Table for printers with one or more markers. One configuration of multiple markers might be a continuous-forms or cut-sheet EP monochrome printer with an in-line color inkjet or spot color marker adding “highlight” to the page. The configurations listed above are also examples of printers with multiple markers.

In a given printer, each marker will result in an entry in the Marker Table. Among other things, each entry will consist of a Unit and two Counters. One counter (prtMarkerPowerOnCount) is reset when power to the printer is cycled. The other counter (prtMarkerLifeCount) is intended to reflect the current total usage of the marker, and should be stored in a non-volatile portion of printer memory.

Life and power-on counters are associated with the *Marker*, not the *Printer*. There is no general overall life counter in the Printer MIB. Even in the monochrome case, markers can be replaced while portions of the media path (gears, belts) or elements of the printer (controller, covers, buttons, trays, bins) remain in place. Overall life of the printer, in terms of Marker Life units can be derived, but not without knowledge of the printer’s operational characteristics with respect to color or multi-marker printing.

The Marker Table allows us to assign an index and form an entry for each individual marker in the printer. Each marker can be a different technology (as in EP followed by ink-jet) and each can select an appropriate life counter unit. Although marker life counters are read-only, the Service Person should have a means of resetting these values (or the printer should do it automatically and reliably) whenever a marker is renewed in the printer.

Clarification of Marker Life Count with respect to Color Printing.

CLARIFICATION

Note that a marker is not the same as a marker supply, although, in some cases, they may be treated alike (as when prtMarkTech is electrophotographicLaser and the associated prtMarkerSuppliesType is OPC.

To properly account for marker life in a color printer, first assign each marker an index, giving it an entry in the Marker Table. Choose an appropriate value for prtMarkerCounterUnit, from the list of enumerated values, based on the marker technology, and operating environment, keeping in mind that overall accounting will be made easier if counter units are the same or compatible. For example, a mid-range cut-sheet printer with 4 color EP process should have 4 entries in the Marker Table. Each entry would be associated with one process colorant (Black, Cyan, Yellow, Magenta). In this case, it would make sense for all markers to select the same life counter unit (ex. impressions). Assuming the printer is capable of operating with one pass of the drum with conventional monochrome (black) use, only the "black" marker would increment it's life counter with conventional pages. Most likely (but again, depending on actual printer operation and image content) for color printing, all 4 markers would increment the life count for each impression. Of course, there is the potential for each marker to be operated (and counted) in a monochrome fashion.

The same example can be applied to a different technology if we think about the color ink jet printer with four distinct markers (heads). Again, 4 table entries, each selecting the same life counter unit (ex. character). Remember that marker life is not the same as supply level, although there are cases where marker and supply are integrated such that they exhaust simultaneously. In this inkjet example it is even easier to see how each marker life counter may increment independently.

For the final example, consider the 3 (or 4) color, 2 marker inkjet printer. This type of printer would have 2 entries in the Marker Table. One entry would have 3 associated process colors (C, Y, M). The other marker would indicate 1 process color (black). In a 3 color process, the "black" marker would only increment it's life counter for conventional monochrome printing. The "color" marker would increment it's life counter for any color other than black (including monochrome "yellow", for example). In a 4 color process, the black marker life count could increment during "color" printing.

OTHER CONSIDERATIONS

This clarification makes use of the standard Printer MIB as described in RFC1759, with no additions or changes to the RFC. Other proposals have been discussed. For instance, we could add an optional extension to the Marker Group, allowing each marker to indicate a life count multiplier. This option may have a slight advantage for a particular technology - one where *all* printing (monochrome and color) requires more than one market to engage. This solution has the disadvantage of requiring an additional to the MIB, yet it would not cover most of the examples given above.

One area where the Printer MIB could have made Marker Life counting a bit more friendly would be to provide a description with the Marker. It is possible, by knowing the number of colorants associated with each marker and by traversing the Marker Supplies Table, to determine which marker is the "color" marker and which the "black", but a description would be helpful.