|  |
| --- |
| HP Smart Device Services |
| HP Printer Counters & Meters |
| Lab Guide  November 2020  M.McCullough |

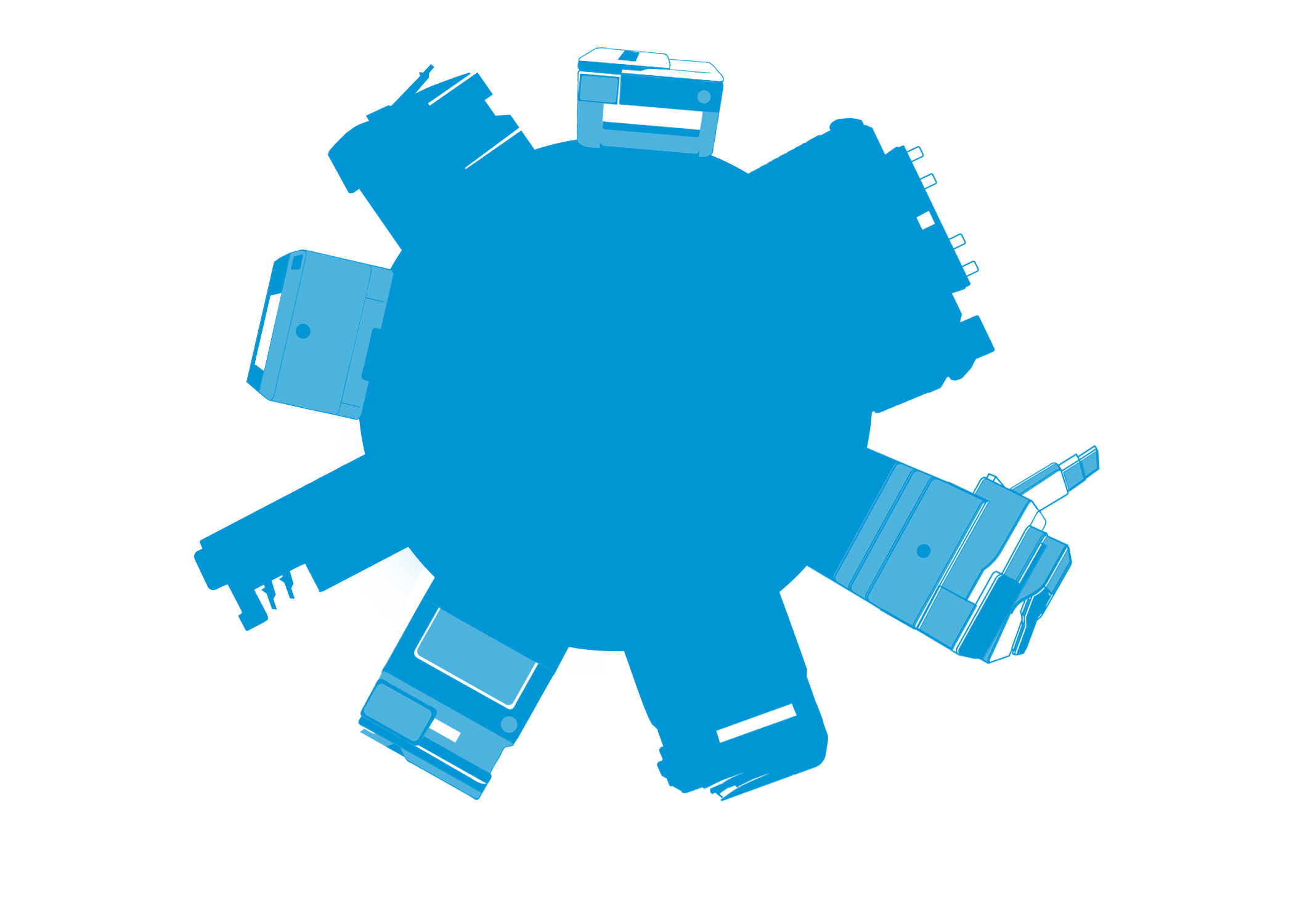


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# Lab Environment

## HP Counters White Paper

One purpose of this lab is to clarify content that exists in the following whitepaper, “[HP Enterprise – Impression Based Usage and Engine Cycling Counting](https://support.hp.com/wps/hp-skp-portlets/document/manuals/attachments/564/c06111503.pdf/EN).” In that paper HP explains why Engine Cycles is not weighted for billing, explains Impression based counters, and explains how these meters can increment different over time.

## Print Grayscale – CMYK or K Only

The table below helps identify different areas where a student should look to recognize when K only verses CMYK is used to create a print job when the driver has selected, “Print Grayscale”

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## Hex to Decimal Conversion

Pulling device counters can be integers, integers with floating point decimal, or octet string. This lab has a batch file that returns each of these values. Use the provided calculator to convert the IEEE 754 binary single precision value to a decimal representation (ie- floating point decimal). Two ‘tools’ described below…

### SpeedCrunch = PC Application calculator:

See screen shot below. Steps are:

1. VIiew menu, select FUNCTIONS.
2. Double-click ‘ieee754\_decode’. This enters/starts the formula into the formula bar, bottom left.
3. Type the following: **0x**

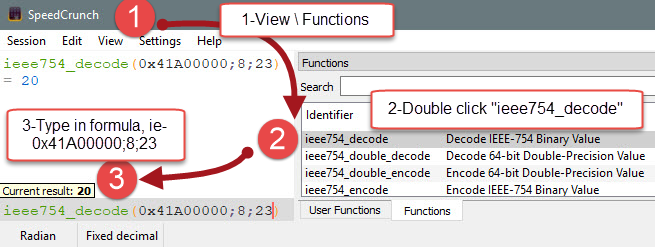
Type the value returned from the script. Example would be, **481A0000**

When complete it will look like: **0x481A0000**

1. To complete the formula, always append **;8;23.**

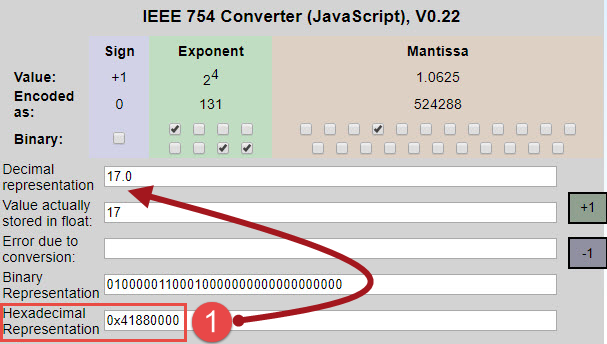
When complete it will display **0x481A0000;8;23**

1. For this example, the computed value is 20



### **Online calculator:** <https://www.h-schmidt.net/FloatConverter/IEEE754.html>

1. <https://www.h-schmidt.net/FloatConverter/IEEE754.html>
2. In field “Hexadecimal Representation” type in the value **0x48110000**
3. The result value is **17.0**



# Lab Method To Record Meters

## Script to collect SNMP OIDs from Printer

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| --- |
| PURPOSE: Using SNMP, collect from HP printer OIDs defined in the public printer MIB and proprietary HP MIB. This may include contractually authorized OIDs enabled by JetAdvantage Management used by HP Smart Device Services. This script requires installation of <https://sourceforge.net/projects/net-snmp/files/net-snmp%20binaries/5.7-binaries>  (select \*.exe for install onto a Windows workstation). After install place C:\usr\bin into your Windows path.  Run batch filename + IP address of printer. The batch file name is LineItem\_ShortDescriptsion.bat. The command line to run on the DOS/Command line prompt from Windows standard console would be….  LineItem\_ShortDescription.bat [IP\_Address\_of\_Printer]  For example:  C:\> LineItem-ShortDescription.bat 192.168.0.5  The output will print to the console screen and also be written to log as filename as hmmss- -LineItem\_ShortDescription.txt  For Example:  C:\> 7h25m41s--LineItem\_ShortDescription.txt |

# Print Meters – Not Intended for Billing

## Lab 1 – Blank Pages

|  |
| --- |
| **Filename = StudentLab-TestDoc1.rtf** |
| |  |  | | --- | --- | | **Document Properties** | | | *File document has ‘x’ pages* | *4* | | *Pages with CMY* | *1* | | *Pages with K only* | *1* | | *Pages that are Blank* | *2* | |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Step1:** Run the script and record values in the table below on row “Baseline”   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Baseline** | **Pages Output Tray** | **Pages containing K or CMY** | **Engine Cycles –**  **Config Page** | | | **Impressions –**  **Usage Page** | | **Simplex** | **Duplex** | | **Engine Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **Not Applicable** | **Not Applicable** | 34 | 12 | 22 | 30 | 31 | **34** | **50** | | **Step 2: Print Document with the following settings defined in the Printer driver** | | | | | | | | | | | |  |  | | --- | --- | | **Finishing tab**  **Color tab** | Print on both sides = Not Enabled  Print Grayscale = Not Enabled | | | | | | | | | | | | **Step 3: Run script and record values in table below on row “Change”** | | | | | | | | | | | **Change** | **Pages Output Tray** | **Pages containing**  **K or CMY** | **Engine Cycles** | | | **Impressions** | | **Simplex** | **Duplex** | | **Config Page** | | | **Usage Page** | | | **Total**  **Engine**  **Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **4** | **K=1**  **CMY=1** | 38 | 13 | 25 | 31 | 32 | **38** | **50** | | **Step 4: Subtract row “Basline” from row “Change” and record different row below “Delta”** | | | | | | | | | | | **Delta** |  |  | + 4 | +1 | + 3 | + 1 | + 1 | + 4 | +0 | | **Expected Yes / No** | **Yes** | **Yes** | **Yes** | **Yes** | No | **Yes** | **Yes** | **Yes** | **Yes** | |   4 sheets of media picked from input tray and delivered to output tray. Sheet 1, front page K only, backside no toner/ink. Sheet 2 and 3, front and back side no toner/ink. Sheet 4, frontside CMYK, backside no toner/ink.  **X** Engine Cycles counted **3** mono and 1 color. Impressions counted 1 mono 1 color.  If using Engine Cycles how should the customer be billed? | |

## Lab 2 - Duplex

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | **Filename = StudentLab-TestDoc2.rtf** |  | | |  |  | | --- | --- | | **Document Properties** | | | *File document has ‘x’ pages* | *4* | | *Pages with CMY* | *1* | | *Pages with K only* | *1* | | *Pages that are Blank* | *2* | |  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Step1:** Run the script and record values in the table below on row “Baseline”   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Baseline** | **Pages Output Tray** | **Pages containing K or CMY** | **Engine Cycles –**  **Config Page** | | | **Impressions –**  **Usage Page** | | **Simplex** | **Duplex** | | **Engine Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **Not Applicable** | **Not Applicable** | 38 | 13 | 25 | 31 | 32 | **38** | **50** | | **Step 2: Print Document with the following settings defined in the Printer driver** | | | | | | | | | | | |  |  | | --- | --- | | **Finishing tab**  **Color Tab** | Print on both sides = Enabled  Print Grayscale = Not Enabled | | | | | | | | | | | | **Step 3: Run script and record values in table below on row “Change”** | | | | | | | | | | | **Change** | **Pages Output Tray** | **Pages containing**  **K or CMY** | **Engine Cycles** | | | **Impressions** | | **Simplex** | **Duplex** | | **Config Page** | | | **Usage Page** | | | **Total**  **Engine**  **Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **2** | **K=1**  **CMY=1** | 42 | 14 | 28 | 32 | 33 | **38** | **52** | | **Step 4: Subtract row “Basline” from row “Change” and record different row below “Delta”** | | | | | | | | | | | **Delta** |  |  | + 4 | +1 | + 3 | + 1 | + 1 | + 0 | + 2 | | **Expected Yes / No** | **Yes** | **Yes** | No | **Yes** | No | **Yes** | **Yes** | **Yes** | **Yes** | |   2 sheets of media picked from input tray and delivered to output tray. Sheet 1, frontside page K only, backside no toner/ink. Sheet 2, frontside CMYK, backside no CMYK.  **X** Engine Cycles counted 4 (3 mono and 1 color). Impressions counted 1 mono 1 color.  If using Engine Cycles how should the customer be billed? |  | |

## Lab 3 – High Quality Grayscale

|  |  |
| --- | --- |
| **Filename = StudentLab-TestDoc3.rtf** |  |
| |  |  | | --- | --- | | **Document Properties** | | | *File document has ‘x’ pages* | *1* | | *Pages with CMY* | *1* | | *Pages with K only* | *0* | | *Pages that are Blank* | *0* | |  |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Step1:** Run the script and record values in the table below on row “Baseline”   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Baseline** | **Pages Output Tray** | **Pages containing K or CMY** | **Engine Cycles –**  **Config Page** | | | **Impressions –**  **Usage Page** | | **Simplex** | **Duplex** | | **Engine Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **Not Applicable** | **Not Applicable** | 49 | 21 | 28 | 39 | 33 | **45** | **52** | | **Step 2: Print Document with the following settings defined in the Printer driver** | | | | | | | | | | | |  |  | | --- | --- | | **Quality tab**  **Print on Both Sides**  **Print Grayscale** | Professional (if Ink)  Disabled  High Quality Grayscale | | | | | | | | | | | | **Step 3: Run script and record values in table below on row “Change”** | | | | | | | | | | | **Change** | **Pages Output Tray** | **Pages containing**  **K or CMY** | **Engine Cycles** | | | **Impressions** | | **Simplex** | **Duplex** | | **Config Page** | | | **Usage Page** | | | **Total**  **Engine**  **Cycles** | **Color Engine Cycles** | **Mono Engine Cycles** | **Color Impressions** | **Mono Impressions** | | **1** | **K=**  **CMY=1** | 50 | 21 | 29 | 40 | 33 | **46** | **52** | | **Step 4: Subtract row “Basline” from row “Change” and record different row below “Delta”** | | | | | | | | | | | **Delta** |  |  | + 1 | + 0 | + 1 | +1 | + 0 | + 1 | + 0 | | **Expected Yes / No** | **Yes** | **Yes** | **Yes** | No | No | **Yes** | **Yes** | **Yes** | **Yes** | |   🡪Mono Engine Cycles incremented **+1**, but CMY printed onto page.  🡪Mono Engine Cycles increments **+1**, Mono Impressions +0, Color Impressions =1. This also creates a race condition where Mono Engine Cycles increments when Mono Impressions does not. |  |

# Appendix A: Driver Setting Screenshots

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| **General Office - Output is color, counts as Mono?** | |
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# Appendix B: Glossary of Terms

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**Dimplex**: Duplex page with blank back side, required only for jobs having odd number of pages (eDuplexPages setting would prevent/disable). See MIB for more information.

# Appendix C: OIDS

---1.3.6.1.2.1.43.10.2.1.4

TOTAL engine cycles

-- 1.3.6.1.4.1.11.2.3.9.4.2.1.4.1.2.6

total-mono-page-count   OBJECT-TYPE

   SYNTAX          INTEGER

   ACCESS           read-only

   STATUS            optional

   DESCRIPTION " Total number of black pages printed by the device"

::= { status-prt-eng 6 }

-- 1.3.6.1.4.1.11.2.3.9.4.2.1.4.1.2.7

total-color-page-count   OBJECT-TYPE

   SYNTAX          INTEGER

   ACCESS           read-only

   STATUS            optional

   DESCRIPTION " Total number of color pages printed by the device"

::= { status-prt-eng 7 }

COLOR 8x11 Impressions

1.3.6.1.4.1.11.2.3.9.4.2.1.1.16.1.20.2.2.0

MONO 8x11 Impressions

1.3.6.1.4.1.11.2.3.9.4.2.1.1.16.1.20.1.2.0

Simplex Total

1.3.6.1.4.1.11.2.3.9.4.2.1.1.16.1.1.13.0

Duplex Total

1.3.6.1.4.1.11.2.3.9.4.2.1.1.16.1.1.14.0