HP Smart Device Services

HP Printer Counters & Meters

Lab Guide
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HP and Channel Partner Use

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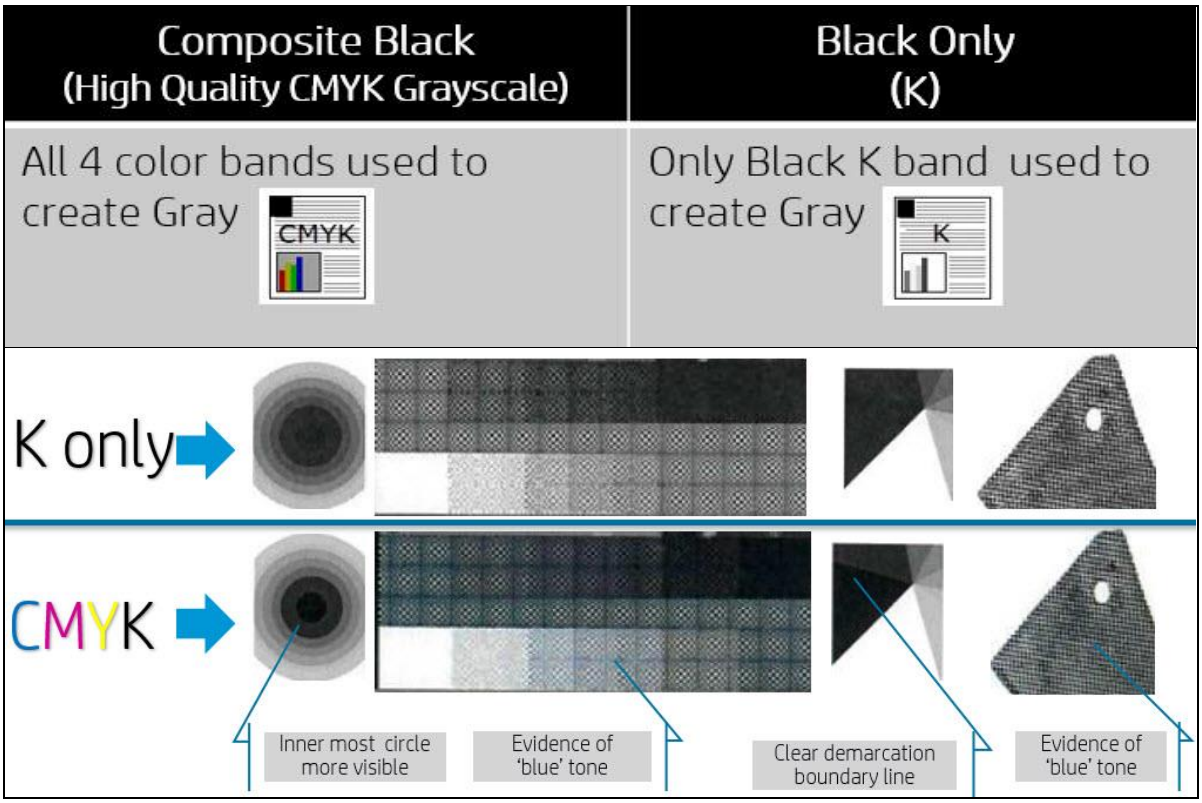
1 Lab Environment

1.1 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." 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.

1.2 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"



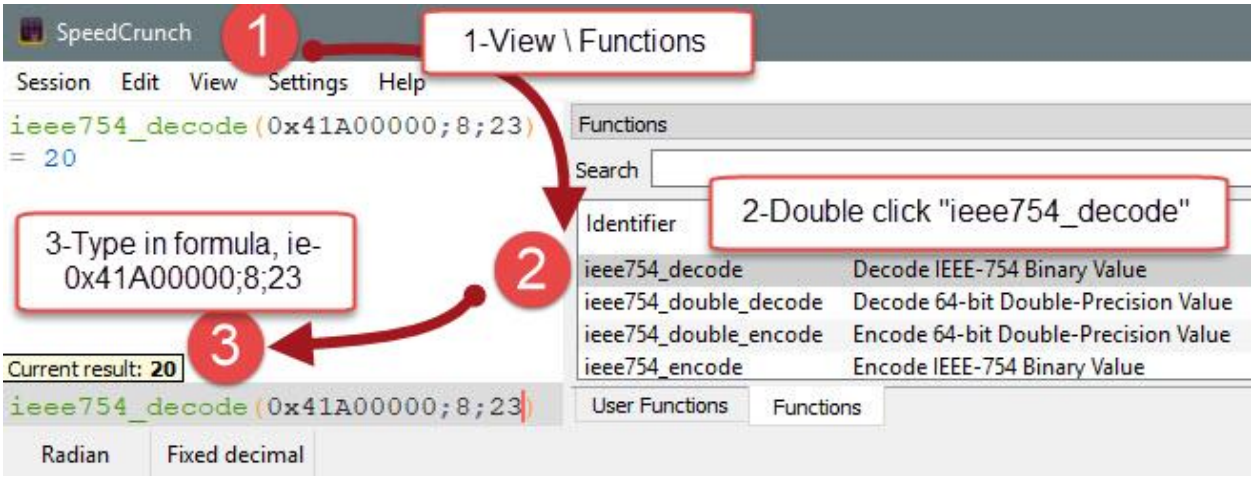
1.3 Hex to Decimal Conversion

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…

1.3.1 SpeedCrunch = PC Application calculator:

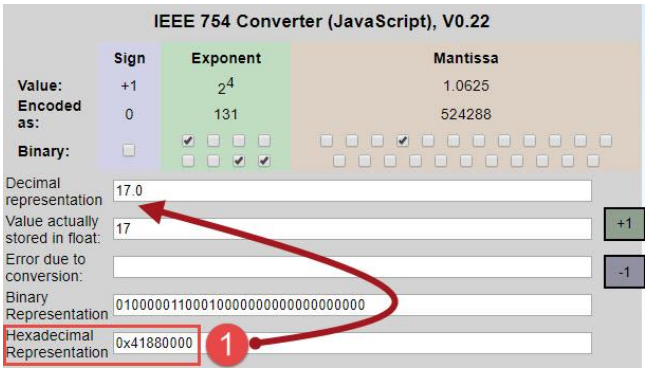
See screen shot below. Steps are:

1- Vliew 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**
4- To complete the formula, always append **;8;23.**
   When complete it will display **0x481A0000;8;23**
5- For this example, the computed value is 20



1.3.2 Online calculator:

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**



2 Lab Method To Record Meters

2.1 Script to collect SNMP OIDs from Printer

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
```

3 Print Meters – Not Intended for Billing

3.1 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"

	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		
Baseline	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	Print on both sides = Not Enabled
Color tab	Print Grayscale = Not Enabled

Step 3: Run script and record values in table below on row "Change"

	Pages Output Tray	Pages containing K or CMY	Engine Cycles Config Page			Impressions Usage Page		Simplex	Duplex
			Total Engine Cycles	Color Engine Cycles	Mono Engine Cycles	Color Impressions	Mono Impressions		
Change	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.

☒ Engine Cycles counted 3 mono and 1 color. Impressions counted 1 mono 1 color.

If using Engine Cycles how should the customer be billed?

3.2 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"

	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		
Baseline	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	Print on both sides = Enabled
Color Tab	Print Grayscale = Not Enabled

Step 3: Run script and record values in table below on row "Change"

	Pages Output Tray	Pages containing K or CMY	Engine Cycles Config Page			Impressions Usage Page		Simplex	Duplex
			Total Engine Cycles	Color Engine Cycles	Mono Engine Cycles	Color Impressions	Mono Impressions		
Change	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?

3.3 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"

	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		
Baseline	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	Professional (if Ink)
Print on Both Sides	Disabled
Print Grayscale	High Quality Grayscale

Step 3: Run script and record values in table below on row "Change"

	Pages Output Tray	Pages containing K or CMY	Engine Cycles Config Page			Impressions Usage Page		Simplex	Duplex
			Total Engine Cycles	Color Engine Cycles	Mono Engine Cycles	Color Impressions	Mono Impressions		
Change	1	K= CMY=1	50	21	29	40	33	46	52

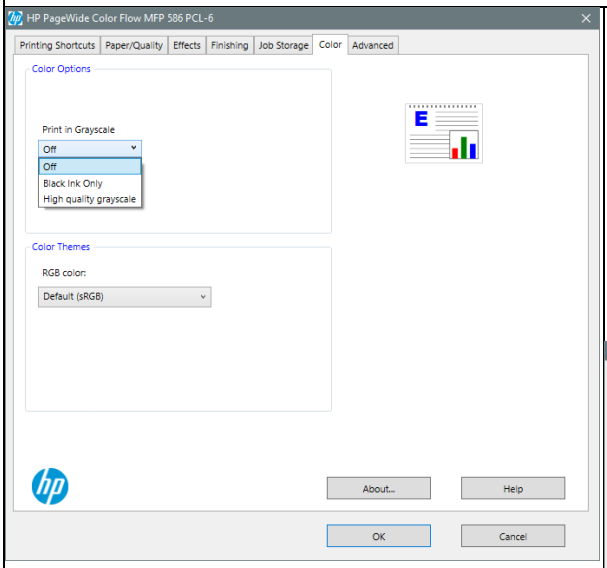
Step 4: Subtract row "Basline" from row "Change" and record different row below "Delta"

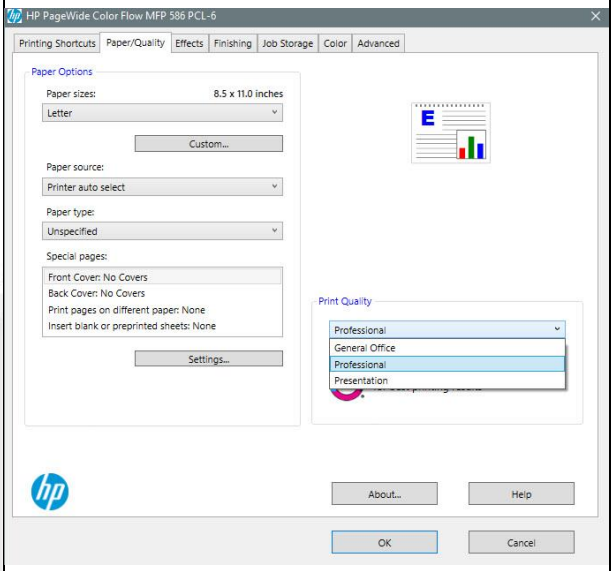
Delta			+ 1	+ 0	+ 1	+1	+ 0	+ 1	+ 0
Expected Yes / No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes

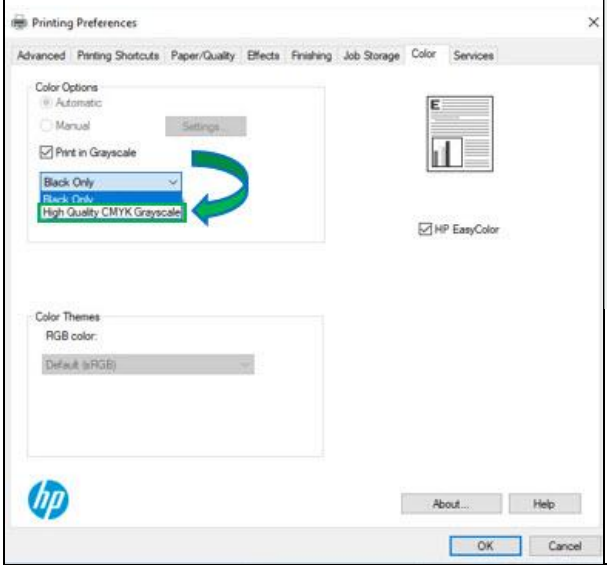
→Mono Engine Cycles incremented +1, but CMY printed onto page.
→Mono Engine Cycles increments +1, Mono Impressions +0, Color Impressions =1. This also creates a race condition where Mono Engine Cycles increments when Mono Impressions does not.

Appendix A: Driver Setting Screenshots

General Office - Output is color, counts as Mono?







Appendix B: Glossary of Terms

Color Engine Cycles: Is a total count of Color Cycle counts. This count tracks all media picked from all media sources on the device which are interpreted as a color sheet at pick time. The count will increment +1 for any sheet the device interprets as simplex (not duplexed) and +2 for any sheet interpreted by the engine as duplex (going through the Duplex paper path). For more detailed information, see the *Engine Cycles* section.

Device: A Printer or Multifunction Printer (MFP)

Duplex: Two-sided page printed using the duplex paper path.

Duplex Paper Path: A path the media will travel through in the printer that allows a sheet to have an impression placed on both sides of the sheet.

Engine Cycles: Is a total count of Monochrome and Color Cycle counts. These counts track all media picked from all media sources on the device. The counts will increment +1 for any sheet the device interprets as simplex (not duplexed) and +2 for any sheet interpreted by the engine as duplex (going through the Duplex paper path). For more detailed information, see the *Engine Cycles* section.

Equivalent Impressions: A count of all impressions on all supported media sizes, converted to an equivalent number Letter/A4 pages. Equivalent impressions are calculated by multiplying the unit value times the number of impressions for each media size.

Impression: A single side of a sheet of media which has toner or ink applied.

Media: Paper, labels, envelopes, transparency, etc. that can have toner or ink applied by a device. Must be supported by the model of printer or MFP.

Pages: Printed sheets of media. Does not include sheets that were not released to the output tray.

Sheet: A single piece of media (all sizes).

Simplex: Single-sided page not printed using the duplex paper path.

Unit value: A numerical value given to each supported media size where Letter and A4 equal one and all other media sizes have a larger or smaller value relative to Letter/A4.

- **Example #1:** A3 is twice the size of A4 and has as unit value of 2.
- **Example #2:** Legal is 8 x 14 and has a unit value of 1.3.

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
```