Calculation Variable Prinhead Resolution

Possible Resolutions

```
$ if(pixel {offset} * = integer)$
In [94]:
import math
def calc possible dpi(interline gaps, dpi ph, ph type):
  possible dpi = [] # dpi
  for dpi img in range(1,3000): # dpi
    dpi_possible = True
    for interlinegap in interlinegaps:
     mult_int = int(interlinegap*(dpi_img/dpi_ph))
      mult double = interlinegap*(dpi img/dpi ph)
      if (mult double - mult int) > 0:
       dpi possible = False
    if dpi_possible:
      possible_dpi.append(dpi_img)
  print("Possible Resolutions of {}".format(ph_type))
  print("dpi img | dpi img/dpi ph")
  for dpi img in possible dpi:
    check mod 2 = fmod((dpi_img/dpi_ph),())
    if check mod 2 == 0:
      print("{:7} | {:14} <--- Possible in FPGA".format(dpi img,dpi img/dpi ph))</pre>
    else:
      print("{:7} | {:14}".format(dpi img,dpi img/dpi ph))
```

KM1024i

```
In [95]:
interlinegaps = [12,28,40] # px
dpi ph = 360.0 # dpi
calc_possible_dpi(interlinegaps, dpi_ph, "Konica Minolta KM1024i")
Possible Resolutions of Konica Minolta KM1024i
dpi img | dpi_img/dpi_ph
    90 I
                  0.25
                         <--- Possible in FPGA
   180 |
                  0.5 <--- Possible in FPGA
    270 |
                 0.75 <--- Possible in FPGA
    360 |
                   1.0 <--- Possible in FPGA
    450 |
                  1.25
                        <--- Possible in FPGA
                   1.5 <--- Possible in FPGA
   540 I
    630 |
                 1.75 <--- Possible in FPGA
                 2.0 <--- Possible in FPGA
2.25 <--- Possible in FPGA
    720 I
   810 I
   900 |
                  2.5 <--- Possible in FPGA
                 2.75 <--- Possible in FPGA
   990 |
                        <--- Possible in FPGA <--- Possible in FPGA
  1080 |
                   3.0
                 3.25
  1170 I
  1260 |
                   3.5 <--- Possible in FPGA
  1350 |
                 3.75 <--- Possible in FPGA
  1440 |
                  4.0
                        <--- Possible in FPGA
                 4.25 <--- Possible in FPGA
  1530 I
                  4.5 <--- Possible in FPGA
  1620 |
                 4.75 <--- Possible in FPGA
  1710 |
  1800 |
                   5.0
                         <--- Possible in FPGA
                 5.25 <--- Possible in FPGA
  1890 I
  1980 |
                   5.5 <--- Possible in FPGA
                 5.75 <--- Possible in FPGA
  2070 |
   2160 |
                  6.0
                        <--- Possible in FPGA
                 6.25 <--- Possible in FPGA
  2250 L
                  6.5 <--- Possible in FPGA
  2340 |
                 6.75 <--- Possible in FPGA
  2430 I
   2520 |
                         <--- Possible in FPGA
                   7.0
                 7.25 <--- Possible in FPGA
  2610 I
  2700 |
                  7.5 <--- Possible in FPGA
                  7.75 <--- Possible in FPGA
  2790 |
                        <--- Possible in FPGA
  2880 I
                   8.0
                 8.25 <--- Possible in FPGA
  2970 I
```

KM1024

```
In [96]:
```

```
interlinegaps = [20] # px
dpi_ph = 360.0  # dpi
calc_possible_dpi(interlinegaps, dpi_ph, "Konica Minolta KM1024")
```

```
Possible Resolutions of Konica Minolta KM1024
dpi_img | dpi_img/dpi_ph
    18 |
                  0.05
    36 |
                   0.1
    54 |
                  0.15
                   0.2
    72 |
    90 |
                  0.25
                         <--- Possible in FPGA
   108 |
                   0.3
   126 |
                  0.35
   144 |
                   0.4
   162 |
                  0.45
   180 |
                         <--- Possible in FPGA
                   0.5
   198 |
                  0.55
   216 I
                   0.6
   234 |
                  0.65
   252 |
                   0.7
   270 |
                  0.75
                         <--- Possible in FPGA
   288 I
                   0.8
   306 |
                  0.85
   324 |
                   0.9
    342 |
                  0.95
   360 |
                         <--- Possible in FPGA
                   1.0
   378 |
                  1.05
   396 |
                   1.1
   414 |
                  1.15
   432 |
                   1.2
   450 I
                  1.25
                         <--- Possible in FPGA
   468 |
                   1.3
                  1.35
    486 |
   504 I
                   1.4
   522 |
                  1.45
   540 |
                  1.5
                         <--- Possible in FPGA
   558 |
                  1.55
   576 I
                   1.6
   594 |
                  1.65
   612 |
                   1.7
                  1.75
    630 |
                         <--- Possible in FPGA
   648 I
                   1.8
   666 |
                  1.85
   684 |
                   1.9
                  1.95
   702 |
   720 |
                  2.0
                         <--- Possible in FPGA
                  2.05
   738 |
   756 |
                   2.1
                  2.15
   774 |
   792 |
                   2.2
                  2.25
   810 |
                         <--- Possible in FPGA
   828 I
                   2.3
                  2.35
   846 |
   864 I
                   2.4
                  2.45
   882 |
   900 |
                   2.5
                         <--- Possible in FPGA
                  2.55
   918 |
   936 |
                   2.6
   954 |
                  2.65
   972 |
                   2.7
                  2.75
                         <--- Possible in FPGA
   990 I
  1008 |
                   2.8
                  2.85
  1026 |
  1044 |
                   2.9
                  2.95
  1062 |
  1080 |
                   3.0
                         <--- Possible in FPGA
                  3.05
  1098 |
  1116 |
                   3.1
                  3.15
  1134 |
  1152 |
                   3.2
  1170 |
                  3.25
                         <--- Possible in FPGA
  1188 |
                   3.3
                  3.35
  1206 I
  1224 |
                   3.4
  1242 |
                  3.45
  1260 |
                   3.5
                        <--- Possible in FPGA
```

1278 1296					
1296	3.55				
	3.6				
1314	3.65				
1332	3.7				
1350	3.75	<	Possible	in	FPGA
1368	3.8				
1386	3.85				
1404	3.9				
1422	3.95				
1440	4.0	<	Possible	in	FPGA
1458	4.05				
1476	4.1				
1494	4.15				
1512	4.2				
1530	4.25	/	Possible	in	FDCA
			rossible	T11	FFGA
1548	4.3				
1566	4.35				
1584	4.4				
1602	4.45				
1620	4.5	<	Possible	in	FPGA
1638	4.55				
1656	4.6				
1674	4.65				
1692	4.7				
	4.75	/	Possible	in	EDCA
			rossible	T11	FFGA
1728	4.8				
1746	4.85				
1764	4.9				
1782	4.95				
1800	5.0	<	Possible	in	FPGA
1818	5.05				
1836	5.1				
1854	5.15				
1872	5.2				
	5.25	/	Possible	in	EDCA
			LOSSIDIE	T11	FFGA
1908	5.3				
1926	5.35				
1944	5.4				
1962	5.45				
1980	5.5	<	Possible	in	FPGA
1998	5.55				
2016	5.6				
2034	5.65				
2052	5.7				
	5.75	<i>/</i>	Possible	in	FDCA
	5.8		10331016	111	LIGH
•					
2106	5.85				
2124	5.9				
2142	5.95				
2160	6.0	<	Possible		
2178	6.05		LOSSIDIE	in	FPGA
0406 1			LOSSIDIE	in	FPGA
2196	6.1		LOSSIDIE	in	FPGA
2196 2214	6.1 6.15		LOSSIDIE	in	FPGA
2214	6.15		LOSSIDIE	in	FPGA
2214 2232	6.15 6.2	<			
2214 2232 2250	6.15 6.2 6.25	<	Possible		
2214 2232 2250 2268	6.15 6.2 6.25 6.3	<			
2214 2232 2250 2268 2286	6.15 6.2 6.25 6.3 6.35	<			
2214 2232 2250 2268 2286 2304	6.15 6.2 6.25 6.3 6.35 6.4	<			
2214 2232 2250 2268 2286 2304 2322	6.15 6.2 6.25 6.3 6.35 6.4 6.45		Possible	in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5			in	FPGA
2214 2232 2250 2268 2286 2304 2322	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5		Possible	in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5		Possible	in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5		Possible	in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5		Possible	in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.65	<	Possible	in in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.65 6.7	<	Possible Possible	in in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.65 6.7 6.75 6.8	<	Possible Possible	in in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.65 6.7 6.75 6.8 6.85	<	Possible Possible	in in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.65 6.7 6.75 6.8 6.85 6.9	<	Possible Possible	in in	FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 6.95	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 6.95 7.0	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 6.95 7.0	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.65 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556 2574	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.55 6.65 6.7 6.75 6.8 6.85 6.9 7.00 7.10 7.15	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1 7.15	<	Possible Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556 2574	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.55 6.65 6.7 6.75 6.8 6.85 6.9 7.00 7.10 7.15	<	Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556 2574 2592	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1 7.15	<	Possible Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2520 2538 2556 2574 2592 2610	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1 7.15 7.2	<	Possible Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2538 2556 2574 2592 2610 2628 2646	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1 7.15 7.2 7.25 7.3	<	Possible Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2538 2556 2574 2592 2610 2628 2646 2664	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 6.95 7.0 7.05 7.1 7.15 7.2 7.25 7.3 7.35	<	Possible Possible Possible	in in	FPGA FPGA
2214 2232 2250 2268 2286 2304 2322 2340 2358 2376 2394 2412 2430 2448 2466 2484 2502 2538 2556 2574 2592 2610 2628 2646	6.15 6.2 6.25 6.3 6.35 6.4 6.45 6.5 6.5 6.6 6.7 6.75 6.8 6.85 6.9 7.0 7.05 7.1 7.15 7.2 7.25 7.3	<	Possible Possible Possible	in in in	FPGA FPGA FPGA

```
2718 |
               7.55
2736 I
                7.6
               7.65
2754 |
2772 I
                7.7
               7.75
2790 |
                      <--- Possible in FPGA
2808 |
                7.8
               7.85
2826 |
2844 |
                7.9
               7.95
2862 |
2880 I
                8.0
                      <--- Possible in FPGA
2898 |
               8.05
2916 |
                8.1
               8.15
2934 |
2952 |
               8.2
2970 |
              8.25
                      <--- Possible in FPGA
2988 |
                8.3
```

Ricoh Gen5

```
In [97]:
```

```
interlinegaps = [13,279,292] # px
dpi_ph = 600.0  # dpi
calc_possible_dpi(interlinegaps, dpi_ph, "Ricoh GEN5")
```

```
Possible Resolutions of Ricoh GEN5

dpi_img | dpi_img/dpi_ph
600 | 1.0 <--- Possible in FPGA
1200 | 2.0 <--- Possible in FPGA
1800 | 3.0 <--- Possible in FPGA
2400 | 4.0 <--- Possible in FPGA
```

Kyocera KJ4B

In [98]:

```
interlinegaps = [0,20,70,80,90,100,150,160,170,180,220,230,240,250,260,300,310,320,330,380,390,400,410,460,480]
# px
dpi_ph = 600.0  # dpi
calc_possible_dpi(interlinegaps, dpi_ph, "Kyocera KJ4B")
```

```
Possible Resolutions of Kyocera KJ4B
dpi_img | dpi_img/dpi_ph
    60 I
                    0.1
   120 |
                    0.2
    180 |
                    0.3
    240 |
                    0.4
    300 |
                    0.5
                          <--- Possible in FPGA
    360 I
                    0.6
    480 |
                    0.8
    540 I
                    0.9
                          <--- Possible in FPGA
    600 |
                    1.0
    720 |
                    1.2
   780 |
                    1.3
    900 |
                    1.5
                          <--- Possible in FPGA
   960 |
                    1.6
   1020 |
                    1.7
   1080 |
                    1.8
   1140 |
                    1.9
                    2.0
                          <--- Possible in FPGA
  1200 I
                    2.1
  1260 |
  1440 |
                    2.4
   1500 |
                    2.5
                          <--- Possible in FPGA
   1560 |
                    2.6
  1740 |
                    2.9
  1800 |
                    3.0
                          <--- Possible in FPGA
                    3.1
   1860 |
                    3.2
   1920 I
                    3.3
   1980 |
   2040 |
                    3.4
   2100 |
                    3.5
                          <--- Possible in FPGA
                    3.6
   2160 I
   2220 |
                    3.7
   2280 |
                    3.8
   2340 |
                    3.9
                    4.0
   2400 I
                          <--- Possible in FPGA
   2520 |
                    4.2
```

2580	1	4.3			
2700		4.5	< Possible	in	FPGA
2820		4.7			
2880		4.8			