

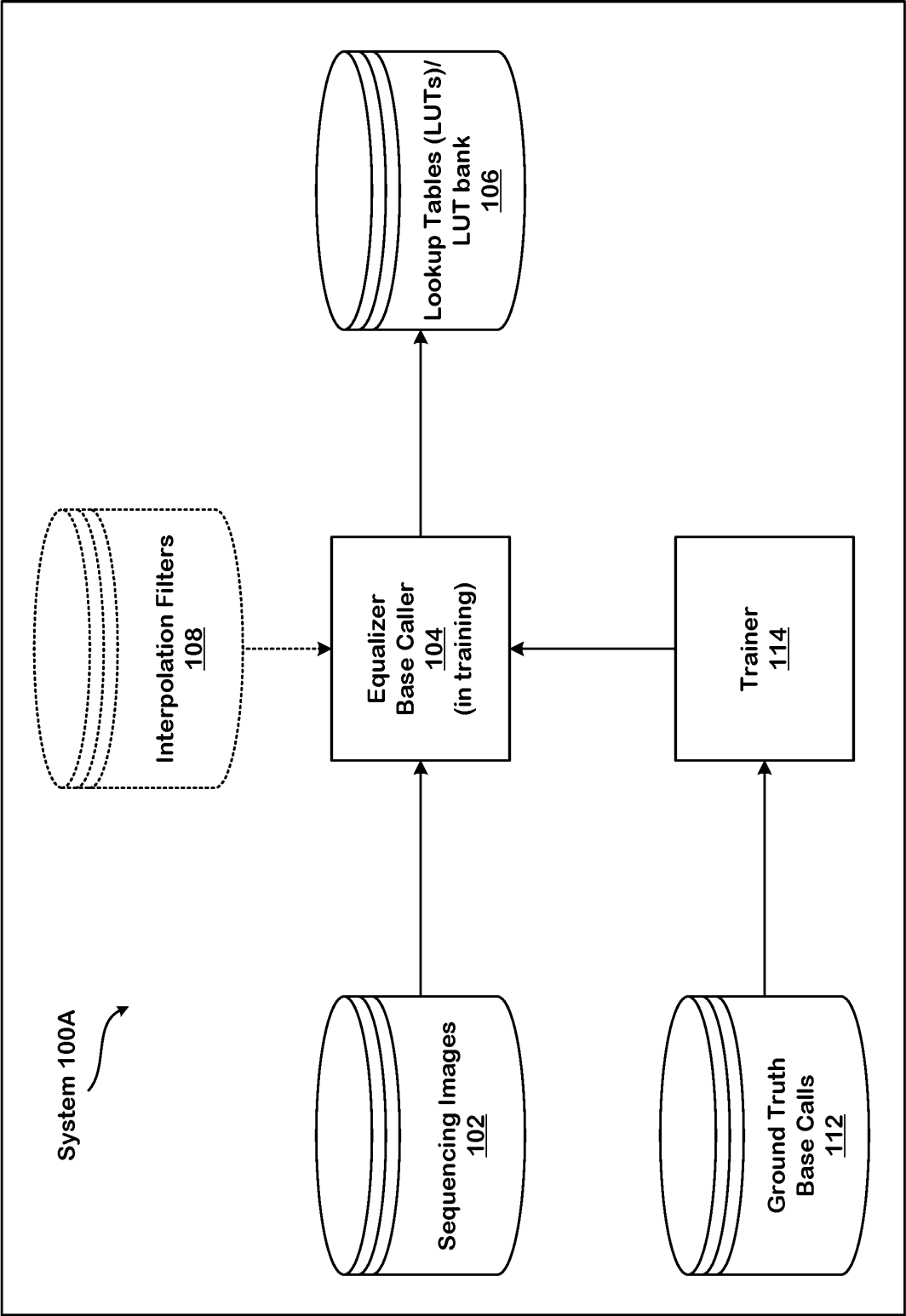


Figure 1A

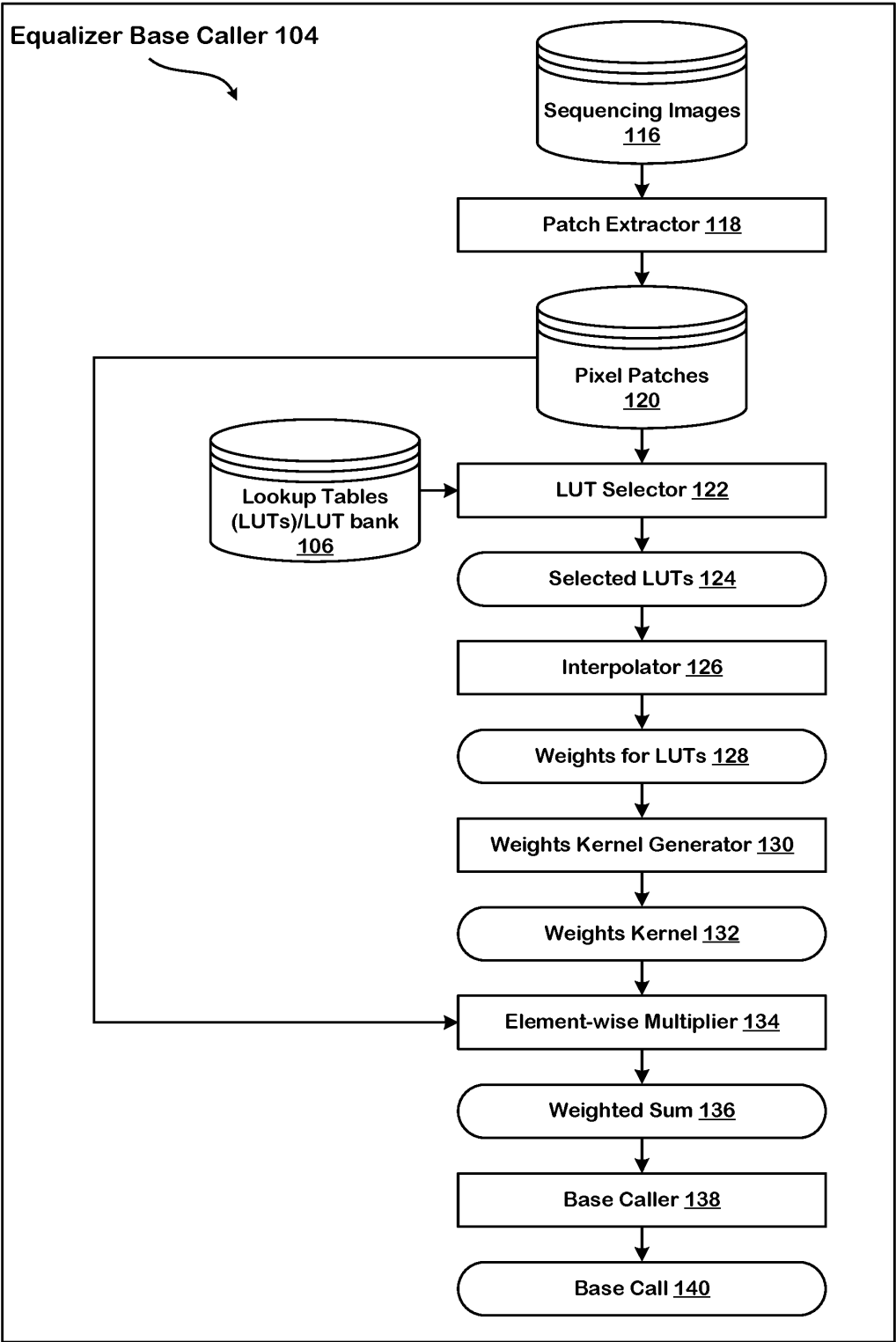


Figure 1B

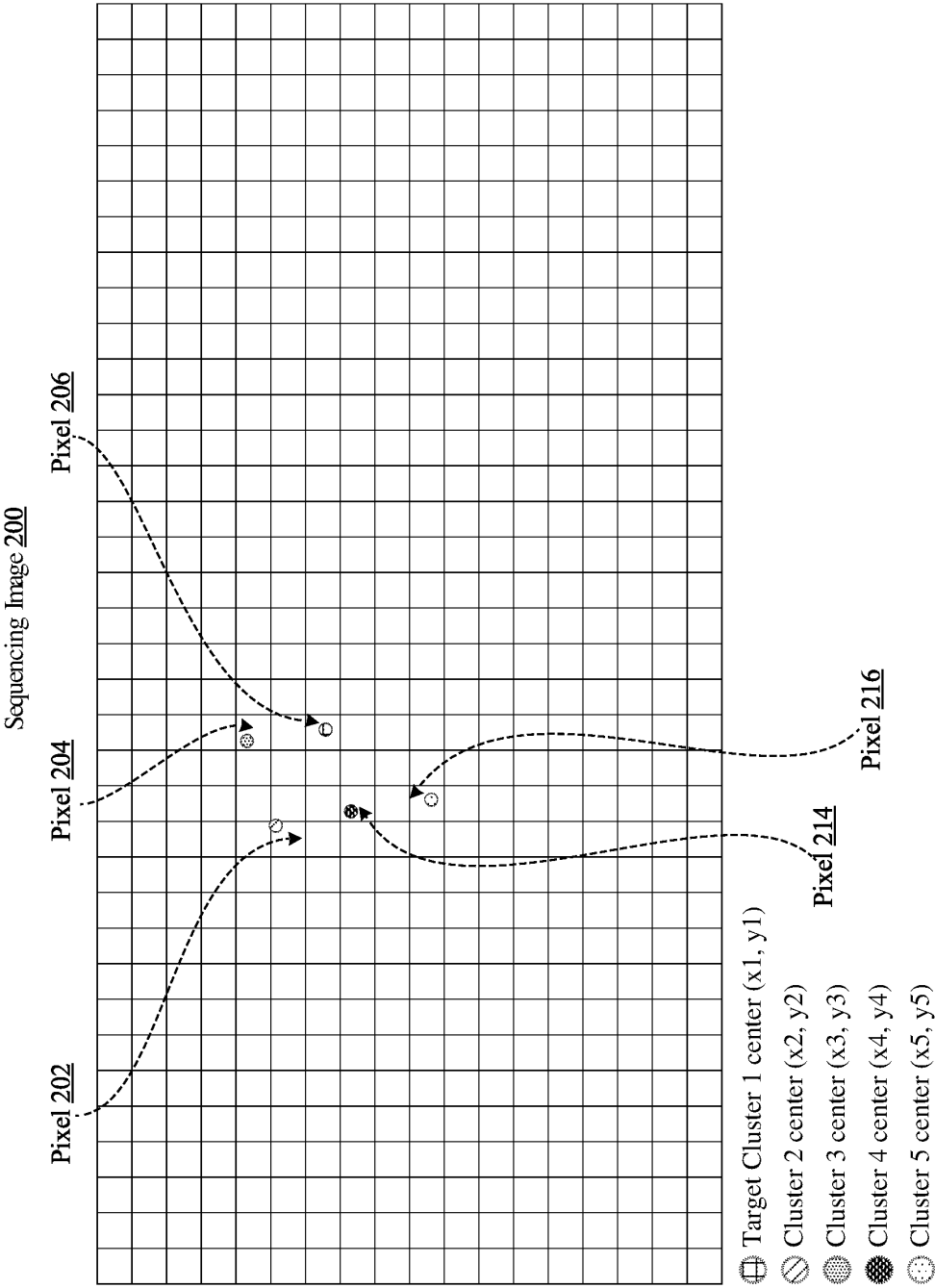


Figure 2

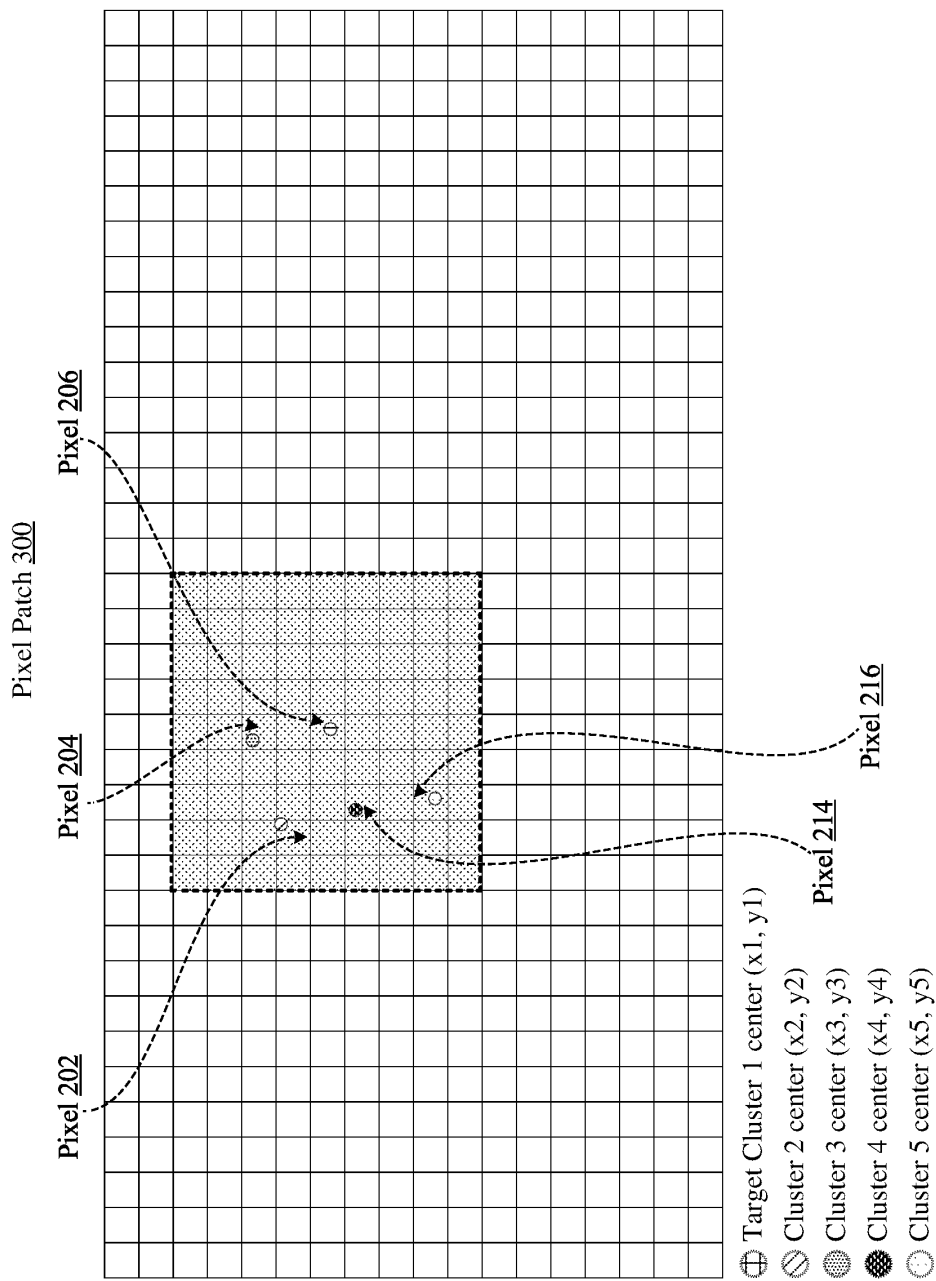


Figure 3

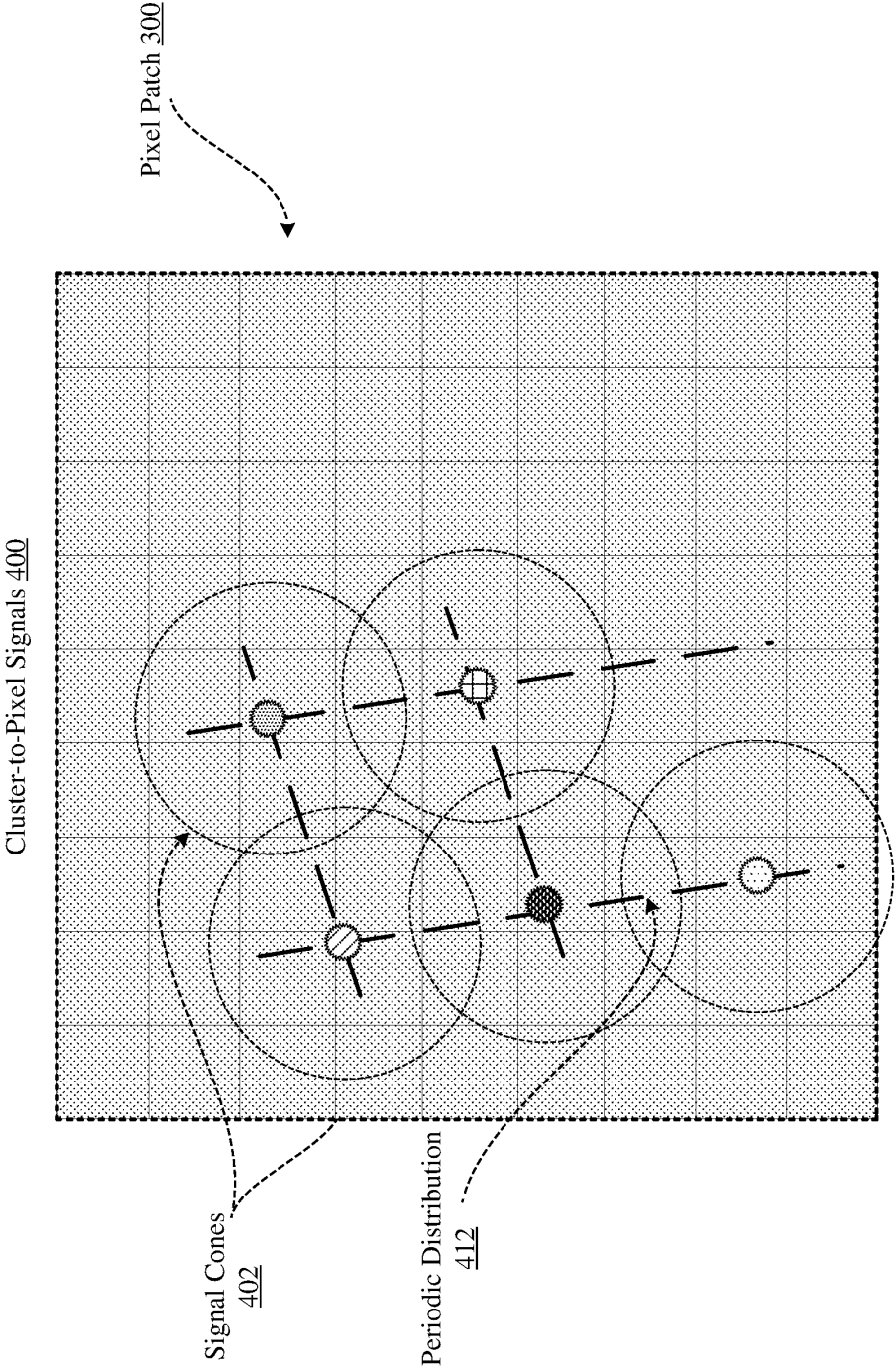


Figure 4

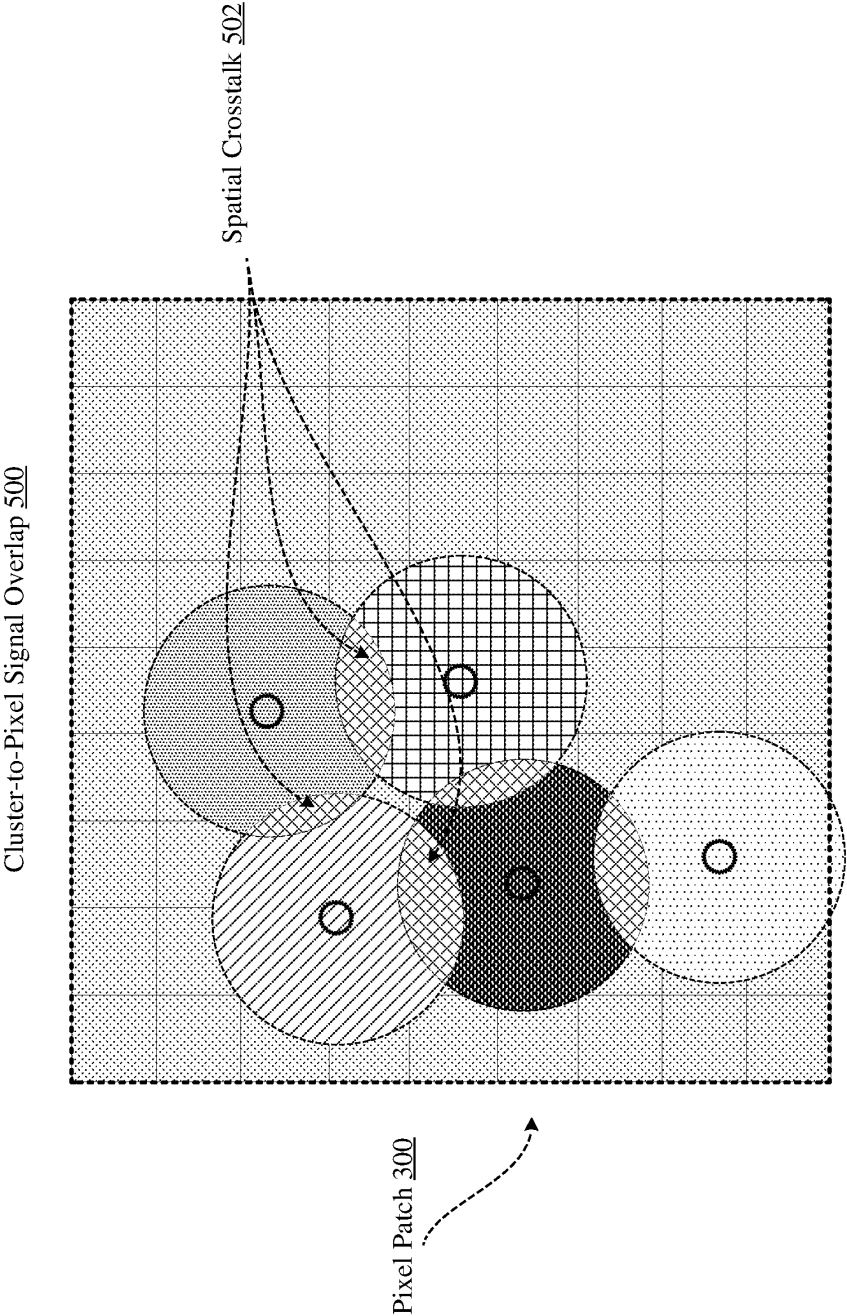


Figure 5

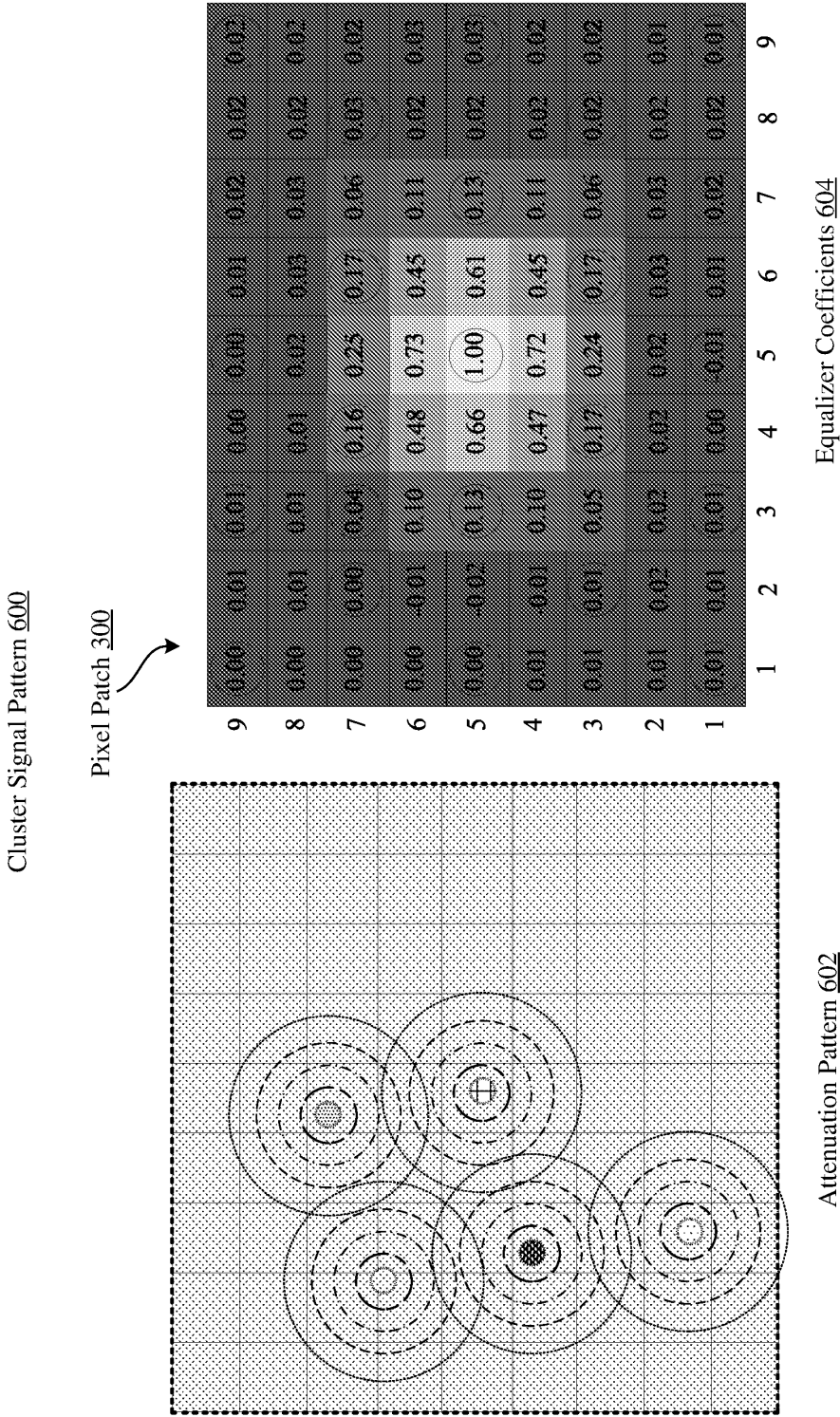


Figure 6

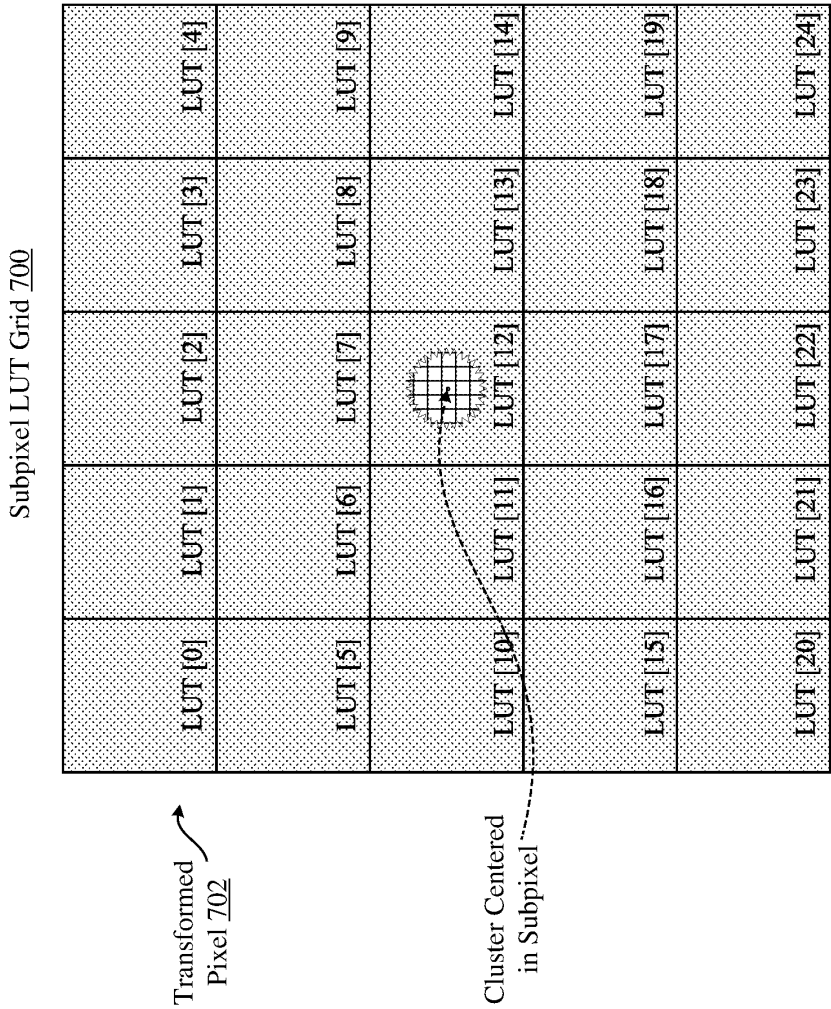


Figure 7

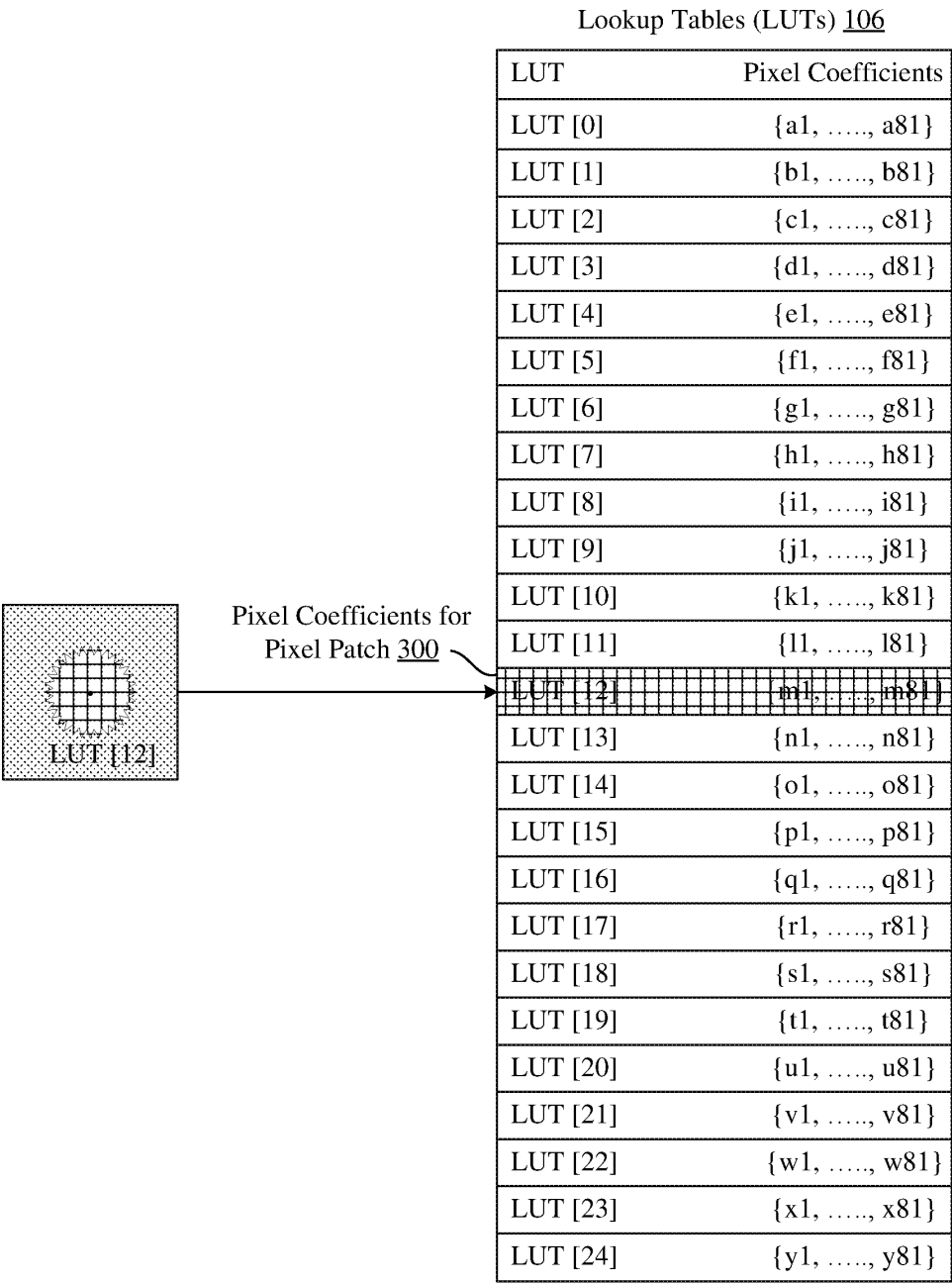


Figure 8

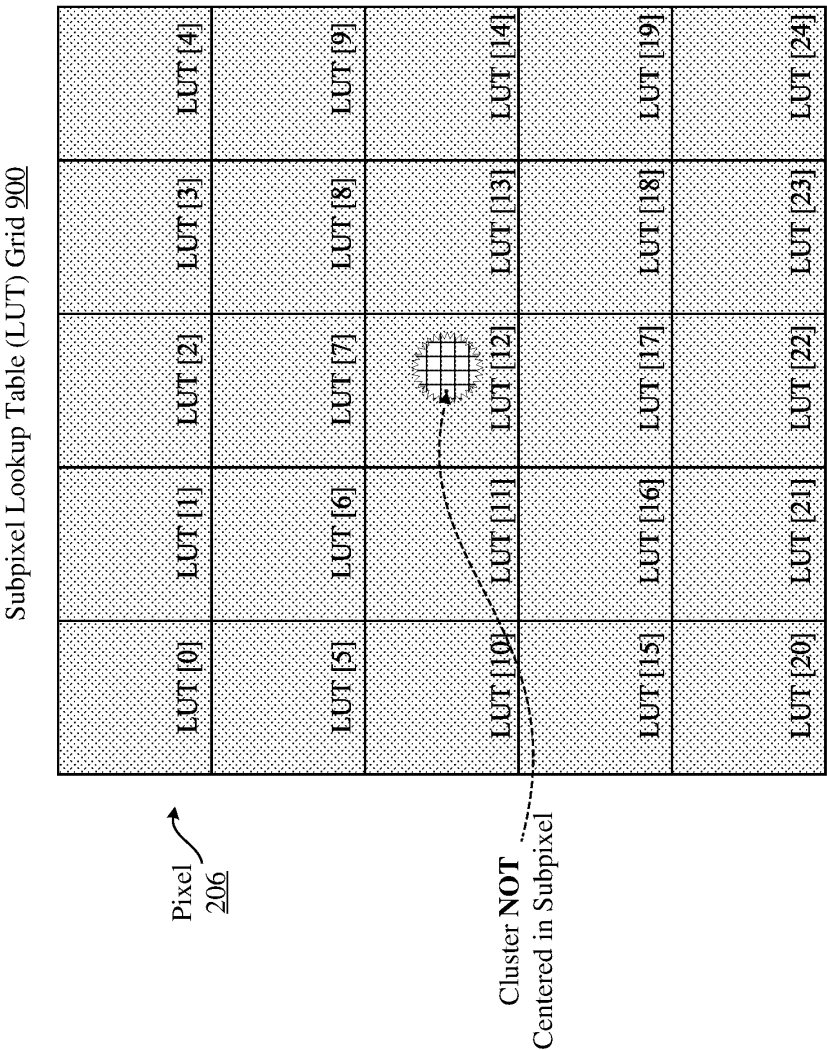


Figure 9

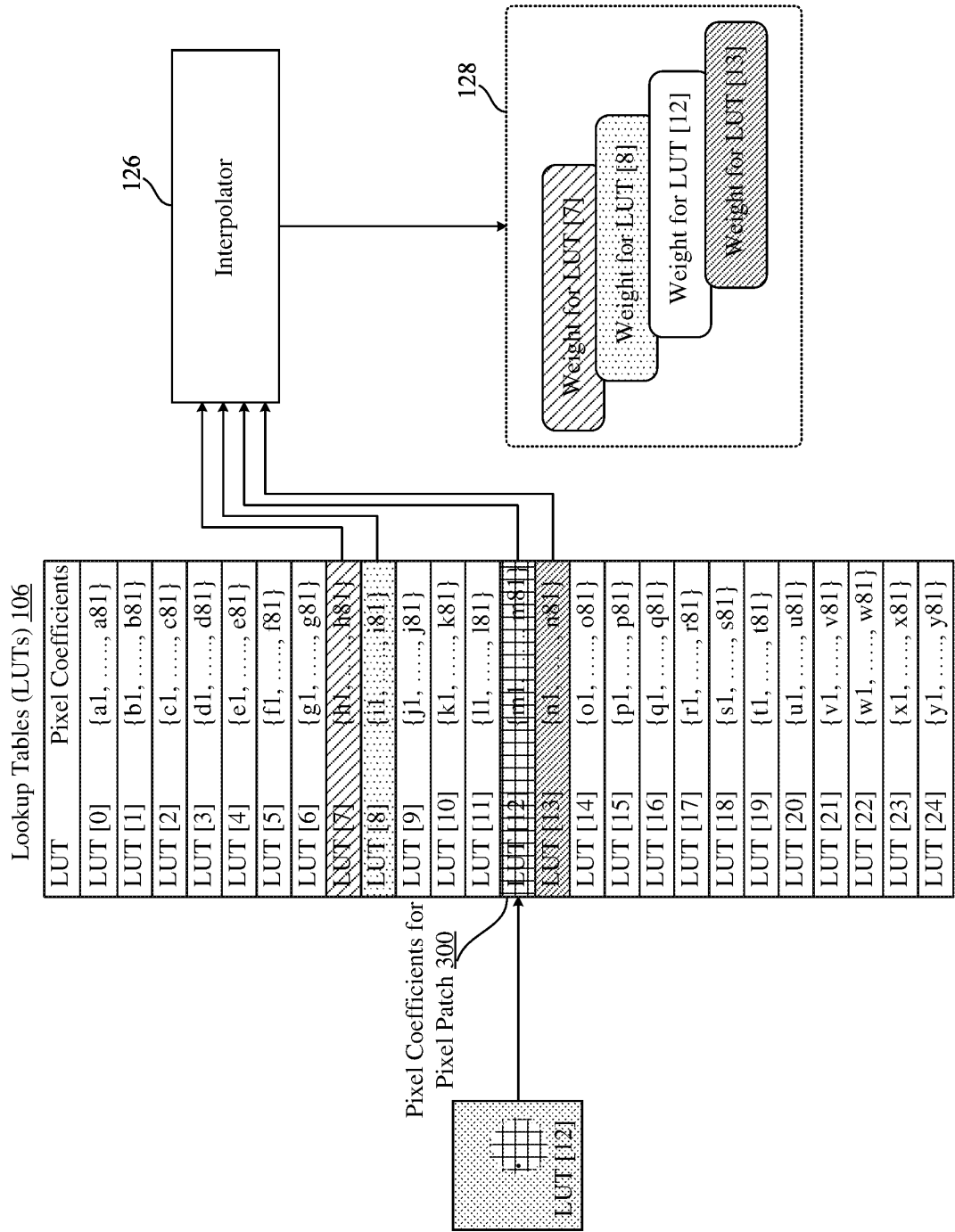


Figure 10

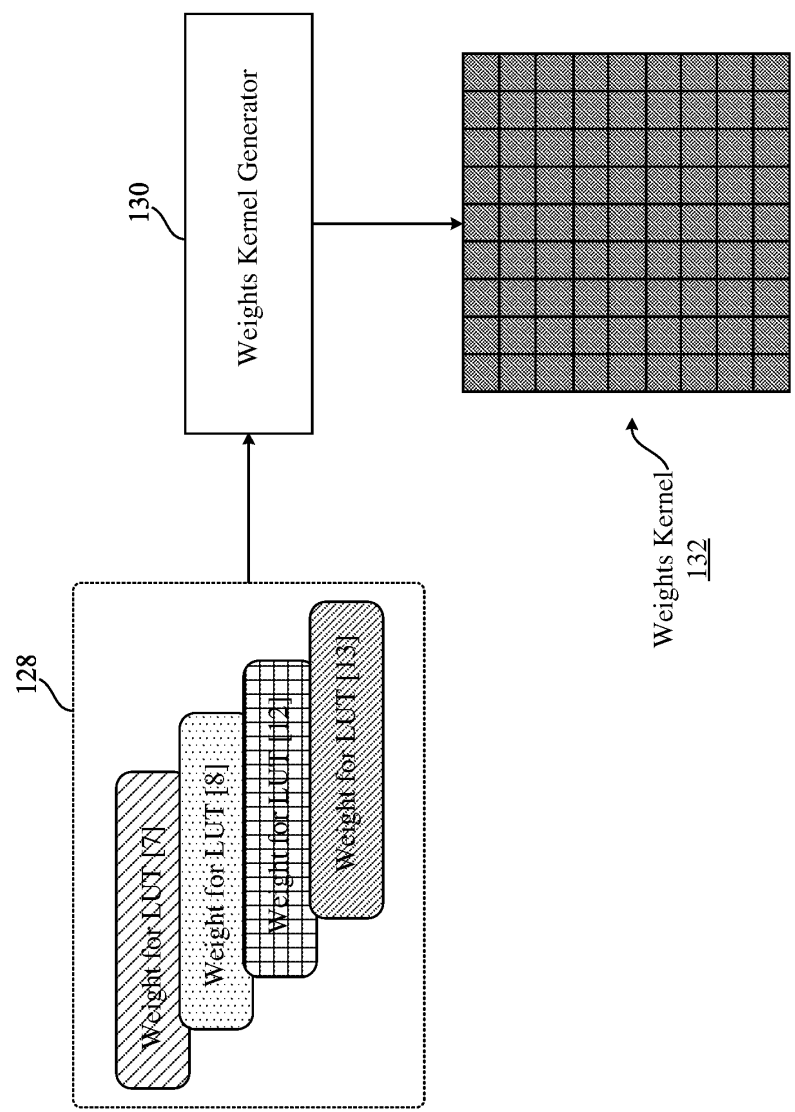


Figure 11

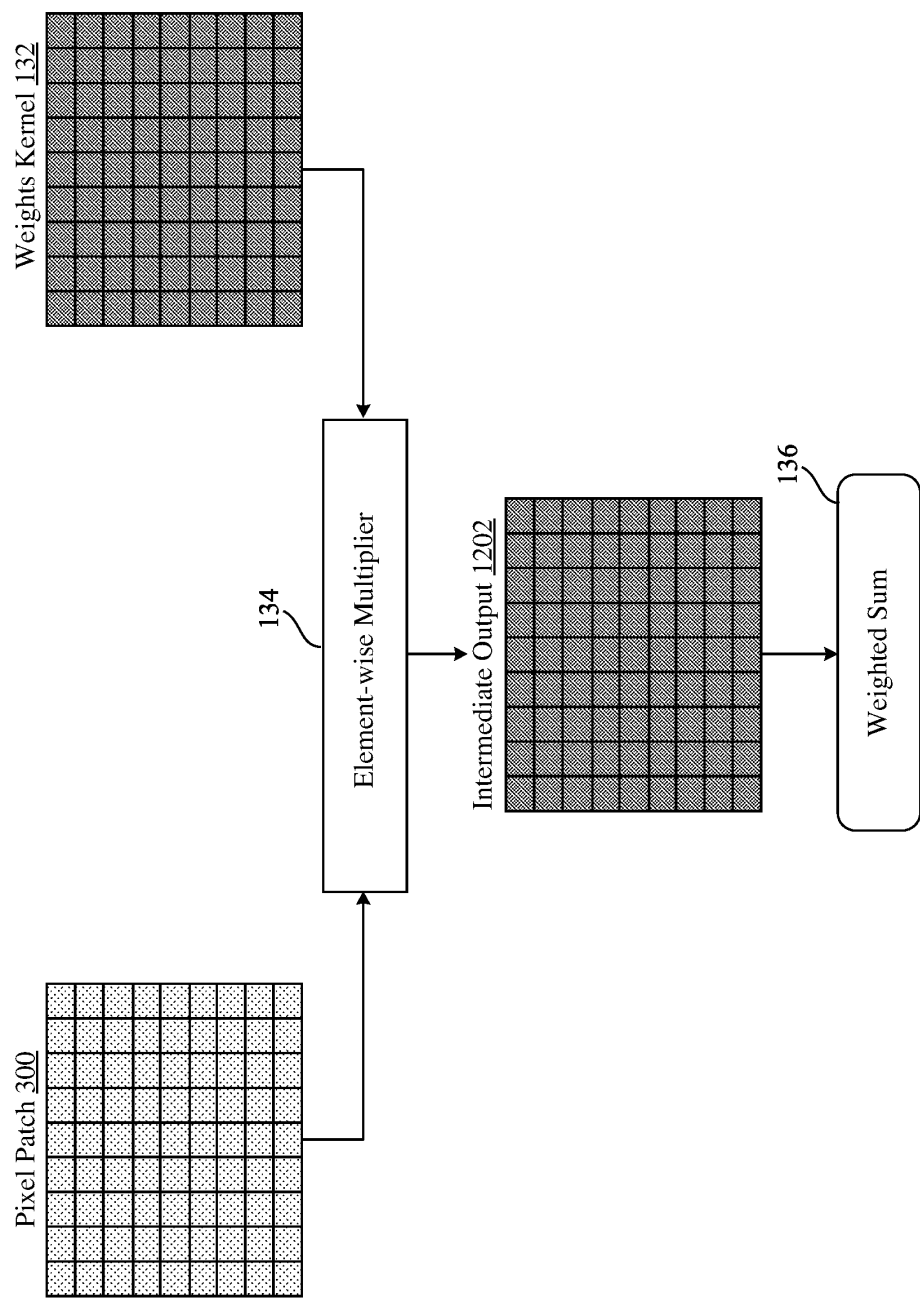


Figure 12

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Cluster Subpixel Location																	
2	X	Y																
3	4.00E-01	5.50E-01																
4																		
5																		
6																		
7																		
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27																		
28																		
29																		

Legend for Co ordinates	
0,0	x
0,1	y
1,0	
1,1	

Figure 13A

Interpolation logic 1312

P19	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Cluster Subpixel Location																		
2	X	Y																	
3	0.400E-01	5.500E-01																	
4																			
5																			
6																			
7	LUT [7]																		
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.92E-07	4.38E-06	1.40E-06	2.90E-06	-2.47E-07	6.74E-06	-7.83E-06	-3.50E-06	-3.13E-06	5.68E-06	4.29E-06	8.91E-06	-4.17E-06	-1.02E-06	
9	-1.08E-05	-8.29E-06	-1.92E-05	-9.00E-06	-1.65E-06	9.76E-06	-9.53E-06	-2.59E-05	-2.19E-06	-1.77E-05	-1.83E-06	-2.40E-05	-1.31E-05	5.83E-07	1.56E-05	5.28E-06	-2.09E-05	-2.13E-06	
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	4.97E-05	-1.78E-06	-5.25E-06	4.63E-06	-2.74E-06	1.74E-06	1.01E-05	8.13E-06	3.93E-05	4.20E-05	1.12E-05	-1.24E-05	-7.13E-06	
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.74E-06	-2.29E-06	1.07E-05	3.23E-06	1.03E-04	2.38E-04	1.78E-04	2.96E-05	-9.53E-06	9.99E-06	
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.62E-06	9.43E-06	-1.55E-06	5.71E-06	1.04E-04	3.06E-04	2.26E-04	4.17E-05	2.26E-05	-3.39E-06	
13	-7.35E-06	3.43E-06	-5.90E-06	7.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.76E-05	-1.26E-05	-3.23E-06	-9.50E-06	1.13E-05	9.11E-05	7.29E-05	2.08E-05	-4.69E-06	1.44E-05	
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-4.61E-06	-1.34E-05	-2.07E-05	-2.39E-06	1.06E-05	1.24E-05	-2.87E-05	-2.30E-05	-1.38E-05	
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	-1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	2.41E-06	-2.32E-06	-1.90E-05	7.44E-06	4.70E-06	3.83E-06	-1.80E-06	-1.49E-05	2.34E-06	
16	-5.44E-06	1.14E-06	1.02E-05	4.08E-06	-8.81E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-1.59E-06	5.91E-06	-1.77E-05	-6.47E-06	-1.43E-06	-2.38E-06	-1.25E-05	9.17E-07	1.18E-05	
17																			
18																			
19	LUT [2]																		
20	LUT [12]																		
21	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	2.16E-06	4.20E-07	-7.31E-06	2.20E-05	-1.83E-06	3.96E-06	2.54E-07	-2.13E-06	2.16E-06	
22	3.06E-06	-1.86E-05	-1.06E-05	-1.36E-05	9.15E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-7.25E-06	-1.05E-05	-1.50E-05	-1.39E-05	8.40E-06	-6.47E-07	8.83E-06	-1.81E-05	-2.47E-06	
23	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-05	-4.50E-06	-1.08E-05	2.62E-07	-1.59E-05	6.23E-06	-6.82E-06	2.20E-06	4.06E-06	2.03E-05	5.81E-06	-2.10E-05	6.08E-06	
24	6.14E-06	1.00E-05	3.00E-05	9.33E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	-3.54E-06	9.26E-06	1.95E-05	7.80E-05	1.80E-04	1.32E-04	3.60E-05	3.52E-06	1.88E-06	
25	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.37E-06	1.01E-05	5.21E-06	1.25E-04	3.18E-04	2.35E-04	3.83E-05	5.98E-06	8.90E-06	
26	2.03E-06	-1.14E-05	-2.11E-06	5.76E-05	1.47E-04	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	-9.30E-06	-1.70E-06	-7.34E-06	5.40E-05	1.56E-04	1.25E-04	2.76E-05	6.50E-06	3.85E-07	
27	1.57E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	-8.81E-06	-3.61E-06	-2.67E-06	6.84E-06	4.65E-06	1.59E-06	-1.98E-05	-2.51E-05	-3.35E-06	
28	1.13E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	9.36E-06	-1.17E-05	-6.40E-06	-3.03E-06	1.23E-05	2.88E-07	-2.22E-05	-1.55E-05	-4.00E-06	
29	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	8.53E-07	3.49E-06	-7.18E-06	1.15E-05	-2.81E-06	-3.71E-06	-1.12E-05	-1.33E-06	9.11E-06	

Legend for Co ordinates	
0,0	Y
1,0	
1,1	
X	

Figure 13B

Interpolation logic 1322

P19	A	B	C	D	f_x	$I = (1 - \text{ABS}(\text{SB}3 - \text{M}19) / (\text{SM}19 - \text{SC}19)) * (1 - \text{ABS}(\text{L}19 - \text{SA}3) / (\text{S}19 - \text{SL}6))$												
1	Cluster Subpixel Location																	
2	X																	
3																		
4																		
5																		
6																		
7	LUT [7]																	
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.92E-07	4.38E-06	1.40E-06	2.90E-06	2.47E-07	2.90E-06	2.47E-07	2.90E-06	2.47E-07	2.90E-06	2.47E-07	2.90E-06	2.47E-07	2.90E-06
9	-1.08E-05	-8.29E-06	-1.92E-05	-9.00E-06	-1.65E-06	9.16E-06	-9.53E-06	-2.59E-05	-2.19E-06	-2.59E-05	-2.19E-06	-2.59E-05	-2.19E-06	-2.59E-05	-2.19E-06	-2.59E-05	-2.19E-06	-2.59E-05
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	4.97E-05	-1.70E-06	-5.25E-06	-4.63E-06	-5.25E-06	-4.63E-06	-5.25E-06	-4.63E-06	-5.25E-06	-4.63E-06	-5.25E-06	-4.63E-06	-5.25E-06
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.76E-06	9.77E-07	3.76E-06	9.77E-07	3.76E-06	9.77E-07	3.76E-06	9.77E-07	3.76E-06	9.77E-07
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.02E-06	1.19E-05	2.02E-06	1.19E-05	2.02E-06	1.19E-05	2.02E-06	1.19E-05	2.02E-06	1.19E-05
13	-7.35E-06	3.43E-06	-5.90E-06	4.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.76E-05	-1.07E-05	1.76E-05	-1.07E-05	1.76E-05	-1.07E-05	1.76E-05	-1.07E-05	1.76E-05	-1.07E-05
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-1.35E-05	-1.01E-05	-1.35E-05	-1.01E-05	-1.35E-05	-1.01E-05	-1.35E-05	-1.01E-05	-1.35E-05
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	-1.24E-05	1.20E-05	-1.24E-05	1.20E-05	-1.24E-05	1.20E-05	-1.24E-05	1.20E-05	-1.24E-05
16	-5.44E-06	1.14E-06	-1.02E-05	4.08E-06	-6.61E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-8.05E-06
17																		
18																		
19	LUT [12]																	
20	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	1.67E-06	1.30E-06	1.67E-06	1.30E-06	1.67E-06	1.30E-06	1.67E-06	1.30E-06	1.67E-06
21	3.06E-06	-1.86E-05	-1.06E-05	-1.36E-05	9.15E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-1.51E-05	-9.99E-07	-1.51E-05	-9.99E-07	-1.51E-05	-9.99E-07	-1.51E-05	-9.99E-07	-1.51E-05
22	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-06	-4.50E-06	-1.08E-05	2.62E-07	-1.08E-05	2.62E-07	-1.08E-05	2.62E-07	-1.08E-05	2.62E-07	-1.08E-05	2.62E-07	-1.08E-05
23	6.14E-06	1.00E-05	3.00E-05	9.33E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	1.01E-04
24	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.81E-04
25	2.03E-06	-1.14E-05	-2.11E-06	5.76E-05	1.47E-04	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	8.34E-05
26	1.57E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	5.38E-06
27	1.13E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	-1.36E-05
28	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	-2.67E-06
29																		
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93																		
94																		
95																		
96																		
97																		
98																		
99																		
100																		

Legend for Coordinates	
0,0	x
0,1	y
1,0	
1,1	

Figure 13D

Interpolation logic 1332

P19	I = (1-ABS(\$B3-M19)/(\$M\$19-\$C\$19))*((1-ABS(L19-\$A\$3)/(\$I\$19-\$L\$6))																		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Cluster Subpixel Location																		
2	X	Y																	
3	0.400E-01	5.50E-01																	
4																			
5																			
6	LUT[7] Subpixel Location (X, Y)																		
7	LUT [7]																		
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.97E-05	1.97E-05	1.40E-06	2.90E-06	-2.47E-07	6.74E-06	LUT [8]								
9	-1.08E-05	-8.29E-06	-1.92E-05	-9.00E-06	-1.65E-06	-1.65E-06	-9.53E-06	-2.59E-05	-2.19E-06	-1.77E-05	-7.83E-06	-3.50E-06	-3.13E-06	5.68E-06	4.29E-06	8.91E-06	-4.17E-06	-1.02E-06	
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	2.74E-05	-1.79E-06	-5.25E-06	-4.63E-06	-2.74E-06	1.74E-06	1.01E-05	8.13E-06	3.93E-05	4.20E-05	1.12E-05	-1.24E-05	-7.13E-06	
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.74E-06	-2.29E-06	1.07E-05	3.23E-06	1.03E-04	2.38E-04	1.78E-04	2.96E-05	-9.53E-06	9.99E-06	
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.92E-06	9.43E-06	-1.55E-06	5.71E-06	1.04E-04	3.06E-04	2.26E-04	4.17E-05	2.26E-05	-3.39E-06	
13	-7.5E-06	3.43E-06	-5.90E-06	4.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.76E-05	-1.26E-05	-3.23E-06	-9.50E-06	3.13E-05	9.11E-05	7.29E-05	2.08E-05	-4.69E-06	1.44E-05	
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-4.61E-06	-1.34E-05	-2.07E-05	-2.39E-06	1.06E-05	1.24E-05	-2.87E-05	-2.30E-05	-1.38E-05	
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	2.41E-06	-2.37E-06	-1.90E-05	7.44E-06	4.76E-06	3.83E-06	-1.80E-06	-1.49E-05	2.34E-06	
16	-5.44E-06	1.14E-06	-1.02E-05	4.08E-06	-6.61E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-1.59E-06	5.91E-06	-1.77E-05	6.47E-06	-1.43E-06	-2.38E-06	-1.25E-05	9.17E-07	1.18E-05	
17																			
18																			
19	LUT [12] Subpixel Location (X, Y)																		
20	LUT [12]																		
21	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	2.16E-06	LUT [13]								
22	3.06E-06	-1.86E-05	-1.06E-05	-1.36E-05	9.15E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-7.25E-06	-1.05E-05	-1.50E-05	-1.39E-05	8.40E-06	-6.47E-07	8.83E-06	-1.81E-05	-2.47E-06	
23	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-05	4.50E-06	-1.08E-05	2.62E-07	-1.59E-05	6.23E-06	6.82E-06	2.20E-06	4.06E-06	2.03E-05	5.81E-06	-2.10E-05	6.08E-06	
24	6.14E-06	1.00E-05	3.00E-05	9.33E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	-3.54E-06	9.26E-06	1.95E-05	7.80E-05	1.80E-04	1.32E-04	3.60E-05	3.52E-06	1.88E-06	
25	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.37E-06	1.01E-05	5.21E-06	1.25E-04	3.18E-04	2.35E-04	3.83E-05	5.98E-06	8.90E-06	
26	2.03E-06	-1.14E-05	-2.11E-06	8.34E-05	1.47E-04	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	-9.30E-06	-1.70E-06	-7.34E-06	5.40E-05	1.56E-04	1.25E-04	2.76E-05	6.50E-06	3.85E-07	
27	1.57E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	-8.81E-06	-3.61E-06	-2.67E-05	6.84E-06	-4.65E-06	1.59E-06	-1.98E-05	-2.51E-05	-3.35E-06	
28	1.13E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	9.36E-06	-1.17E-05	-6.40E-06	-3.03E-06	1.23E-05	2.88E-07	-2.22E-05	-1.55E-05	-4.00E-06	
29	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	8.53E-07	3.49E-06	-7.18E-06	1.15E-05	-2.81E-06	-3.71E-06	-1.12E-05	-1.33E-06	9.11E-06	

Legend for Coordinates	
0,0	x
0,1	y
1,0	
1,1	

Figure 13E

Interpolation logic 1332

P19	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Cluster Subpixel Location																		
2	X																		
3	Y																		
4	5.50E-01																		
5	LUT[7] Subpixel Location (X, Y)																		
6	0.25																		
7	LUT[7]																		
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.97E-05	4.38E-06	1.40E-06	2.90E-06	-2.47E-07	6.74E-06	-7.83E-06	-3.50E-06	-3.13E-06	5.68E-06	4.29E-06	8.91E-06	-4.17E-06	-1.02E-06	
9	-1.08E-05	-8.29E-06	-1.92E-05	-9.00E-06	-1.65E-06	9.16E-06	-9.53E-06	-2.59E-05	-2.19E-06	-1.77E-05	-1.83E-06	-2.40E-05	-1.31E-05	5.83E-07	1.56E-05	5.28E-06	-2.09E-05	-2.13E-06	
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	4.97E-05	-1.79E-06	-5.25E-06	-4.63E-06	-2.74E-06	1.74E-06	1.01E-05	8.13E-06	3.93E-05	4.20E-05	1.12E-05	-1.24E-05	-7.13E-06	
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.56E-06	-2.29E-06	1.07E-05	3.23E-06	1.03E-04	2.38E-04	1.78E-04	2.96E-05	-9.53E-06	9.99E-06	
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.49E-06	9.43E-06	-1.53E-06	5.71E-06	1.04E-04	3.06E-04	2.26E-04	4.17E-05	2.26E-05	-3.39E-06	
13	-7.35E-06	3.43E-06	-5.90E-06	4.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.76E-05	-1.26E-05	-3.23E-06	-9.50E-06	3.13E-05	9.11E-05	7.29E-05	2.08E-05	2.08E-05	4.69E-06	
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-4.61E-06	-1.34E-05	-2.07E-05	-2.39E-06	1.06E-05	1.24E-05	-2.87E-05	-2.30E-05	-1.38E-05	
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	2.41E-06	-2.37E-06	-1.90E-05	7.44E-06	4.76E-06	3.83E-06	-1.80E-06	-1.49E-05	2.34E-06	
16	-5.44E-06	1.14E-06	-1.02E-05	4.08E-06	-6.61E-06	-8.05E-06	-4.39E-06	4.14E-06	-3.05E-06	-1.59E-06	5.91E-06	-1.77E-05	-6.47E-06	-1.43E-06	-2.38E-06	-1.25E-05	9.17E-07	1.18E-05	
17																			
18	LUT[12] Subpixel Location (X, Y)																		
19	0.5																		
20	LUT[12]																		
21	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	2.16E-06	4.20E-07	-7.31E-06	2.20E-05	-1.83E-06	3.96E-06	2.54E-07	-2.13E-06	2.16E-06	
22	3.06E-06	-1.86E-05	-1.06E-05	-1.36E-05	9.15E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-7.25E-06	-1.05E-05	-1.50E-05	-1.39E-05	8.40E-06	-6.47E-07	8.83E-06	-1.81E-05	-2.47E-06	
23	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-05	-4.50E-06	-1.08E-05	2.62E-07	-1.59E-05	6.23E-06	-6.82E-06	2.20E-06	4.06E-06	2.03E-05	5.81E-06	-2.10E-05	6.08E-06	
24	6.14E-06	1.00E-05	3.00E-05	9.33E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	4.14E-06	-3.54E-06	9.26E-06	1.95E-05	7.80E-05	1.80E-04	1.32E-04	3.60E-05	3.52E-06	1.88E-06	
25	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.37E-06	1.01E-05	5.21E-06	1.25E-04	3.18E-04	2.35E-04	3.83E-05	5.98E-06	8.90E-06	
26	2.03E-06	-1.14E-05	-2.11E-06	5.76E-05	1.47E-04	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	-9.30E-06	-1.70E-06	-7.34E-06	5.40E-05	1.56E-04	1.25E-04	2.76E-05	6.50E-06	3.85E-07	
27	1.57E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	-8.81E-06	-3.61E-06	-2.67E-05	6.84E-06	-4.65E-06	1.59E-06	-1.98E-05	-2.51E-05	-3.35E-06	
28	1.13E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	9.56E-06	-1.17E-05	-6.40E-06	-3.03E-06	1.23E-05	2.88E-07	-2.22E-05	-1.55E-05	-4.00E-06	
29	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	8.53E-07	3.49E-06	-7.18E-06	1.15E-05	-2.81E-06	-3.71E-06	-1.12E-05	-1.33E-06	9.11E-06	

Legend for Co ordinates		
0,0	0,1	y
1,0	1,1	x

Figure 13F

132

	Weights Kernel													
32	0.00E+00	-5.25E-06	-4.26E-06	9.56E-06	-2.40E-07	4.14E-06	2.25E-06	1.14E-06	7.21E-07					
33	-4.29E-06	-1.30E-05	-1.50E-05	-1.21E-05	4.92E-06	6.32E-06	-3.16E-06	-1.94E-05	-1.65E-06					
34	9.73E-07	7.98E-06	-5.28E-06	1.26E-05	1.62E-05	3.57E-05	-1.12E-06	-1.04E-05	-1.20E-06					
35	5.24E-06	8.39E-06	2.83E-05	1.05E-04	2.10E-04	1.23E-04	1.99E-05	3.33E-07	2.40E-07					
36	3.66E-06	2.68E-06	1.07E-05	1.58E-04	3.28E-04	1.86E-04	2.49E-05	1.13E-05	4.33E-06					
37	-3.50E-06	-4.82E-06	-4.54E-06	5.21E-05	1.30E-04	8.02E-05	1.63E-05	-5.56E-06	7.55E-06					
38	-4.32E-06	-6.68E-06	-1.89E-05	7.97E-06	2.43E-06	2.52E-06	-2.65E-05	-1.62E-05	-5.23E-06					
39	5.51E-06	-9.64E-06	-1.25E-05	4.87E-06	1.05E-05	-7.54E-06	-1.56E-05	-1.34E-05	3.26E-06					
40	2.33E-06	-1.93E-06	-8.12E-06	8.24E-06	-3.73E-06	-4.49E-06	-9.16E-06	3.70E-06	3.54E-06					
41														
42														

Interpolated Coefficients 1412

Figure 14A

Weights Kernel Generation Logic 1402

A33		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Cluster Subpixel Location																				
1	X																			
2	Y																			
3	94.00E-01																			
4																				
5																				
6																				
7	LUT [7]																			
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.92E-07	4.38E-06	1.40E-06	2.90E-06	-2.47E-07	6.74E-06	-7.84E-06	-3.50E-06	-3.13E-06	5.68E-06	4.29E-06	8.91E-06	-4.17E-06	-1.02E-06		
9	-1.08E-05	-8.29E-06	-4.92E-05	-9.00E-06	-1.65E-06	9.16E-06	-9.53E-06	-2.59E-05	-2.19E-06	-1.77E-05	-1.83E-06	-2.40E-05	-1.31E-05	5.83E-07	1.56E-05	5.28E-06	-2.09E-05	-2.13E-06		
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	4.97E-05	-1.70E-06	-5.25E-06	-4.63E-06	-2.74E-06	1.74E-06	1.01E-05	8.13E-06	3.93E-05	4.20E-05	1.12E-05	-1.24E-05	-7.13E-06		
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.76E-06	-2.29E-06	1.07E-05	3.23E-06	1.03E-04	2.38E-04	1.78E-04	2.96E-05	-9.53E-06	9.99E-06		
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.02E-06	9.43E-06	-1.55E-06	5.71E-06	1.04E-04	3.06E-04	2.26E-04	4.17E-05	2.26E-05	-3.39E-06		
13	-7.35E-06	3.43E-06	-5.90E-06	4.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.76E-05	-1.26E-05	-3.23E-06	-9.50E-06	3.13E-05	9.11E-05	7.29E-05	2.08E-05	-4.69E-06	1.44E-05		
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-4.61E-06	-1.34E-05	-2.07E-05	-2.39E-06	1.06E-05	1.24E-05	-2.87E-05	-2.30E-05	-1.38E-05		
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	2.41E-06	-2.32E-06	-1.90E-05	7.44E-06	4.76E-06	3.83E-06	-1.80E-06	-1.49E-05	2.34E-06		
16	5.44E-06	1.14E-06	-1.02E-05	4.08E-06	-6.61E-06	-8.05E-06	-4.39E-06	-4.14E-06	-3.05E-06	-1.59E-06	5.91E-06	-1.77E-05	6.47E-06	-1.43E-06	-2.38E-06	-1.25E-05	9.17E-07	1.18E-05		
17																				
18																				
19																				
20	LUT [12]																			
21	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	2.16E-06	4.20E-07	-7.31E-06	2.20E-05	-1.83E-06	3.96E-06	2.54E-07	-2.13E-06	2.16E-06		
22	3.06E-06	-7.86E-05	-1.06E-05	-1.36E-05	9.45E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-7.25E-06	-1.05E-05	-1.50E-05	-1.39E-05	8.40E-06	-6.47E-07	8.83E-06	-1.81E-05	-2.47E-06		
23	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-05	-4.50E-06	-1.08E-05	2.62E-07	-1.59E-05	6.23E-06	-6.82E-06	2.20E-06	4.06E-06	2.03E-05	5.81E-06	-2.10E-05	6.08E-06		
24	6.14E-06	1.00E-05	3.00E-05	9.33E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	-4.14E-06	-3.54E-06	9.26E-06	1.95E-05	7.80E-05	1.80E-04	1.32E-04	3.60E-05	3.52E-06	1.88E-06		
25	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.37E-06	1.01E-05	5.21E-06	1.25E-04	3.18E-04	2.35E-04	3.83E-05	5.98E-06	8.90E-06		
26	2.03E-06	-1.14E-05	-2.11E-06	5.76E-05	1.47E-04	8.34E-04	1.79E-05	-5.30E-06	1.52E-06	-9.30E-06	-1.70E-06	-7.34E-06	5.40E-05	1.56E-04	1.25E-04	2.76E-05	6.50E-06	3.85E-07		
27	1.37E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	-8.81E-06	-3.61E-06	-2.67E-05	6.84E-06	-4.65E-06	1.59E-06	-1.98E-05	-2.51E-05	-3.35E-06		
28	1.13E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	9.36E-06	-1.17E-05	-6.40E-06	-3.03E-06	1.23E-05	2.88E-07	-2.22E-05	-1.55E-05	-4.00E-06		
29	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	8.53E-07	3.49E-06	-7.18E-06	1.15E-05	-2.81E-06	-3.71E-06	-1.12E-05	-1.33E-06	9.11E-06		
30	Weights Kernel																			
31	0.00E+00	-5.25E-06	-4.26E-06	9.56E-06	-2.04E-07	4.14E-06	2.25E-06	1.14E-06	7.21E-07											
32	-4.29E-06	-1.30E-05	-1.50E-05	-1.21E-05	4.92E-06	6.32E-06	-3.16E-06	-1.94E-05	-1.65E-06											
33	9.73E-07	7.98E-06	-5.28E-06	1.26E-05	1.62E-05	3.57E-05	-1.12E-06	1.04E-05	-1.20E-06											
34	5.24E-06	8.39E-06	2.83E-05	1.05E-04	2.10E-04	1.23E-04	1.99E-05	3.33E-07	2.40E-07											

Legend for Co ordinates	
0,0	x
0,1	y
1,0	
1,1	

Figure 14B

132

Weights Kernel Generation Logic 1402

SUM	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Cluster Subpixel Location																		
2	X	Y																	
3	9 4.00E-01	1 5.50E-01																	
4																			
5																			
6																			
7	LUT [7]																		
8	5.81E-06	-9.43E-06	-4.40E-06	1.47E-05	1.92E-07	4.38E-06	1.40E-06	2.90E-06	-2.47E-07	6.74E-06	-7.84E-06	-3.50E-06	-3.13E-06	5.68E-06	8.91E-06	4.29E-06	8.91E-06	-4.17E-06	-1.02E-06
9	-1.08E-05	-8.29E-06	-1.92E-05	-9.00E-06	-1.65E-06	9.16E-06	-9.53E-06	-2.59E-05	-2.19E-06	-1.77E-05	-1.83E-06	-2.40E-05	-1.31E-05	5.83E-07	5.28E-06	1.56E-05	5.28E-06	-2.09E-05	-2.13E-06
10	1.11E-06	7.38E-06	-3.92E-06	2.81E-05	2.74E-05	4.97E-05	-1.70E-06	-5.25E-06	-4.63E-06	-2.74E-06	1.74E-06	1.01E-05	8.13E-06	3.93E-05	1.12E-05	4.20E-05	1.12E-05	-1.24E-05	-7.13E-06
11	9.05E-06	5.01E-06	3.53E-05	1.34E-04	2.51E-04	1.37E-04	2.12E-05	9.77E-07	3.76E-06	-2.29E-06	1.07E-05	3.23E-06	1.03E-04	2.38E-04	2.96E-05	1.78E-04	2.96E-05	-9.53E-06	9.99E-06
12	-6.78E-07	2.42E-06	6.26E-06	1.62E-04	3.14E-04	1.66E-04	2.23E-05	1.19E-05	2.02E-06	9.43E-06	-1.55E-06	5.71E-06	1.04E-04	3.06E-04	4.17E-05	2.26E-04	4.17E-05	-9.53E-06	-3.39E-06
13	-7.35E-06	3.43E-06	-5.90E-06	4.83E-05	1.04E-04	6.06E-05	8.32E-06	-1.07E-05	1.74E-05	-1.26E-05	-3.23E-06	-9.50E-06	3.13E-05	9.11E-05	2.08E-05	7.29E-05	2.08E-05	-4.69E-06	1.44E-05
14	-1.14E-05	-1.24E-05	-2.25E-05	7.55E-06	-1.74E-06	-3.89E-06	-2.86E-05	-1.35E-05	-1.01E-05	-4.61E-06	-1.34E-05	-2.07E-05	-2.39E-06	1.06E-05	-2.87E-05	1.24E-05	-2.87E-05	-2.30E-05	-1.38E-05
15	1.14E-05	-1.33E-05	-6.30E-06	-2.74E-07	1.27E-05	-4.26E-06	-1.50E-05	-1.24E-05	1.20E-05	2.41E-06	-2.32E-06	-1.90E-05	7.44E-06	4.76E-06	-1.80E-06	3.83E-06	-1.80E-06	-1.49E-05	2.34E-06
16	-5.44E-06	1.14E-06	-1.02E-05	4.08E-06	-6.61E-06	-8.05E-06	-4.39E-06	-1.14E-06	-3.05E-06	-1.59E-06	5.91E-06	-1.77E-05	6.47E-06	-1.43E-06	-1.25E-05	-2.38E-06	-1.25E-05	9.17E-07	1.18E-05
17																			
18																			
19	LUT [12]																		
20	LUT [12]																		
21	2.44E-06	-3.45E-06	-3.54E-06	5.14E-06	-1.12E-06	4.00E-06	2.21E-06	1.67E-06	1.30E-06	2.16E-06	4.20E-07	-7.31E-06	2.20E-05	-1.83E-06	2.54E-07	3.96E-06	2.54E-07	-2.13E-06	2.16E-06
22	3.06E-06	-7.86E-06	-1.06E-05	-1.36E-05	9.45E-06	4.61E-06	-3.31E-06	-1.51E-05	-9.99E-07	-7.25E-06	-1.05E-05	-1.50E-05	-1.39E-05	8.40E-06	8.83E-06	-6.47E-07	8.83E-06	-1.81E-05	-2.47E-06
23	5.71E-06	9.85E-06	-8.37E-06	5.63E-06	7.91E-06	2.91E-05	-4.50E-06	-1.08E-05	2.62E-07	-1.59E-05	6.23E-06	-6.82E-06	2.20E-06	4.06E-06	5.81E-06	2.03E-05	5.81E-06	-2.10E-05	6.08E-06
24	6.14E-06	1.00E-05	3.00E-05	9.38E-05	1.86E-04	1.01E-04	1.35E-05	7.48E-07	4.14E-06	-3.54E-06	9.26E-06	1.95E-05	7.80E-05	1.80E-04	3.60E-05	1.32E-04	3.60E-05	3.52E-06	1.88E-06
25	6.16E-06	1.70E-06	1.58E-05	1.73E-04	3.43E-04	1.81E-04	2.05E-05	1.03E-05	6.01E-06	1.37E-06	1.01E-05	5.21E-06	1.25E-04	3.18E-04	3.83E-05	2.35E-04	3.83E-05	5.98E-06	8.90E-06
26	2.03E-06	-1.14E-05	-2.11E-06	5.76E-05	1.47E-04	8.34E-05	1.79E-05	-5.30E-06	1.52E-06	-9.30E-06	-1.70E-06	-7.34E-06	5.40E-05	1.56E-04	2.76E-05	1.25E-04	2.76E-05	6.50E-06	3.85E-07
27	1.37E-06	-2.53E-06	-1.43E-05	1.03E-05	5.62E-06	5.38E-06	-2.64E-05	-1.46E-05	-1.04E-06	-8.81E-06	-3.61E-06	-2.67E-05	6.84E-06	-4.65E-06	-1.98E-05	1.59E-06	-1.98E-05	-2.51E-05	-3.35E-06
28	1.35E-06	-7.90E-06	-1.71E-05	9.85E-06	9.57E-06	-1.36E-05	-1.67E-05	-1.33E-05	-6.10E-07	9.36E-06	-1.17E-05	-6.40E-06	-3.03E-06	1.23E-05	2.22E-05	2.88E-07	2.22E-05	-1.55E-05	-4.00E-06
29	8.54E-06	-6.63E-06	-5.38E-06	1.05E-05	-2.42E-06	-2.67E-06	-1.13E-05	5.14E-06	5.17E-06	8.53E-07	3.49E-06	-7.18E-06	1.15E-05	-2.81E-06	-1.12E-05	-3.71E-06	-1.12E-05	-1.33E-06	9.11E-06
30																			
31																			
32	Weights Kernel																		
33																			
34	-4.29E-06	-1.30E-05	-1.50E-05	-1.21E-05	4.92E-06	6.32E-06	-3.16E-06	-1.94E-05	-1.65E-06	7.21E-07									

Figure 14C

Legend for Coordinates	
0,0	
0,1	Y
1,0	
1,1	X

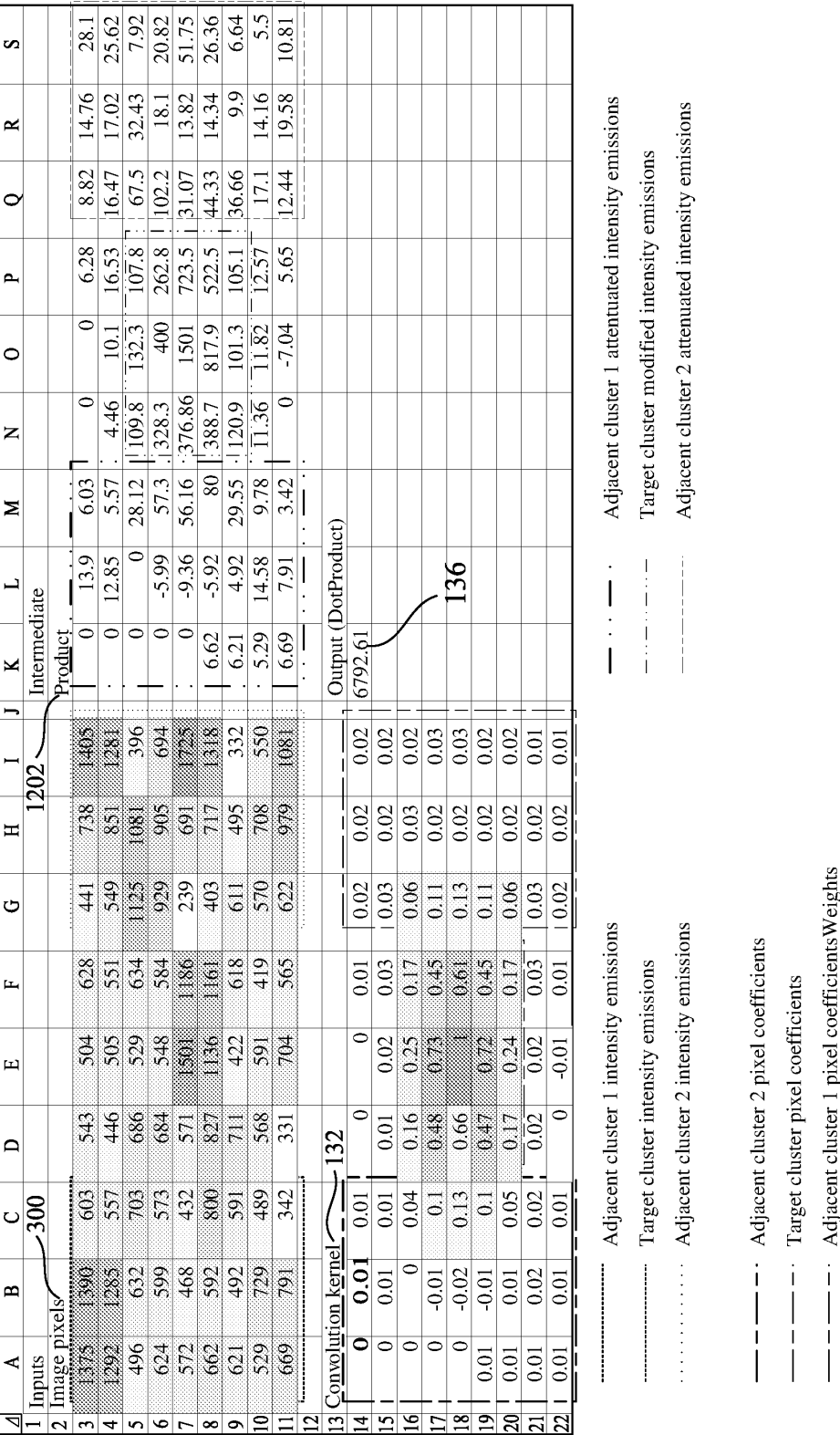
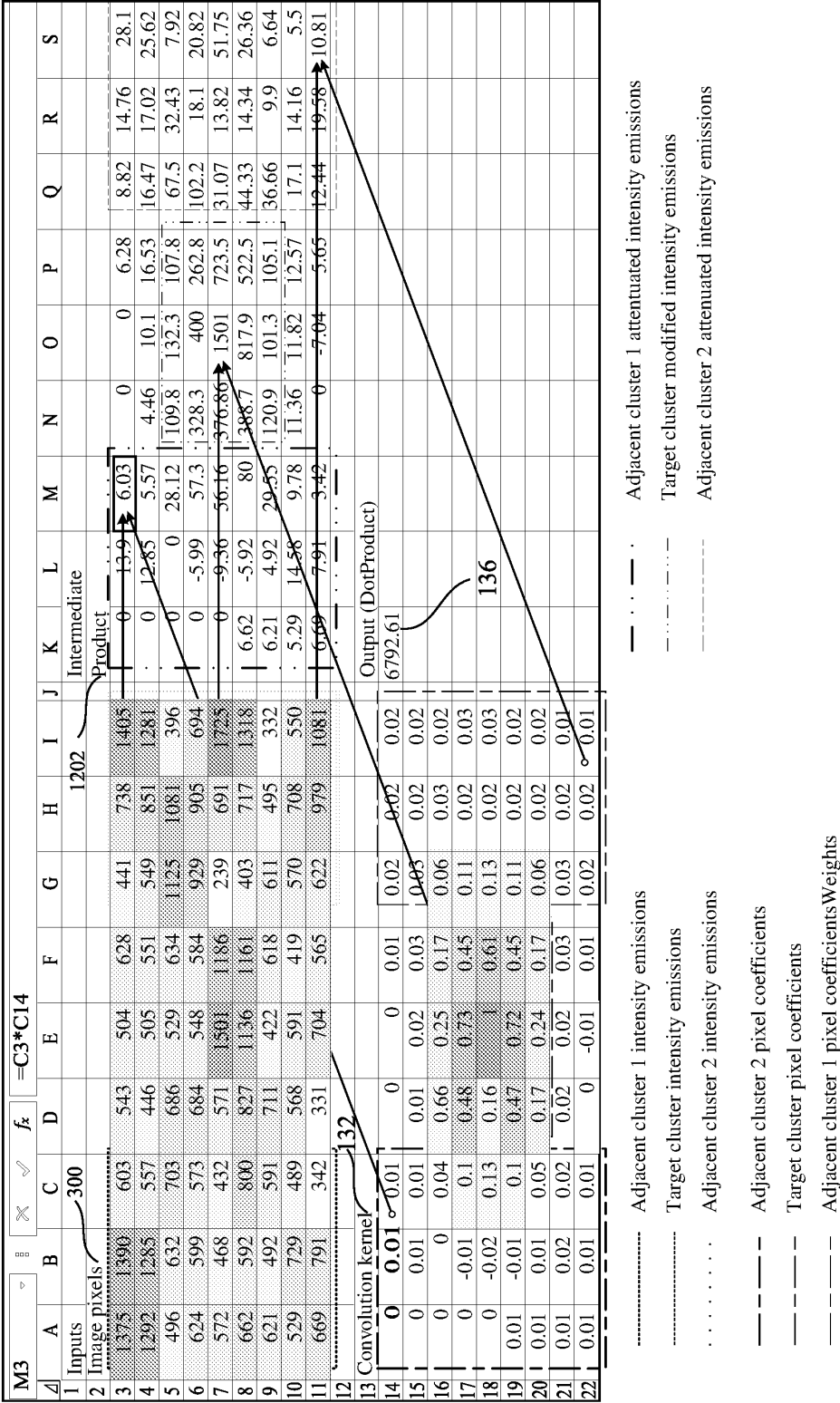


Figure 15A



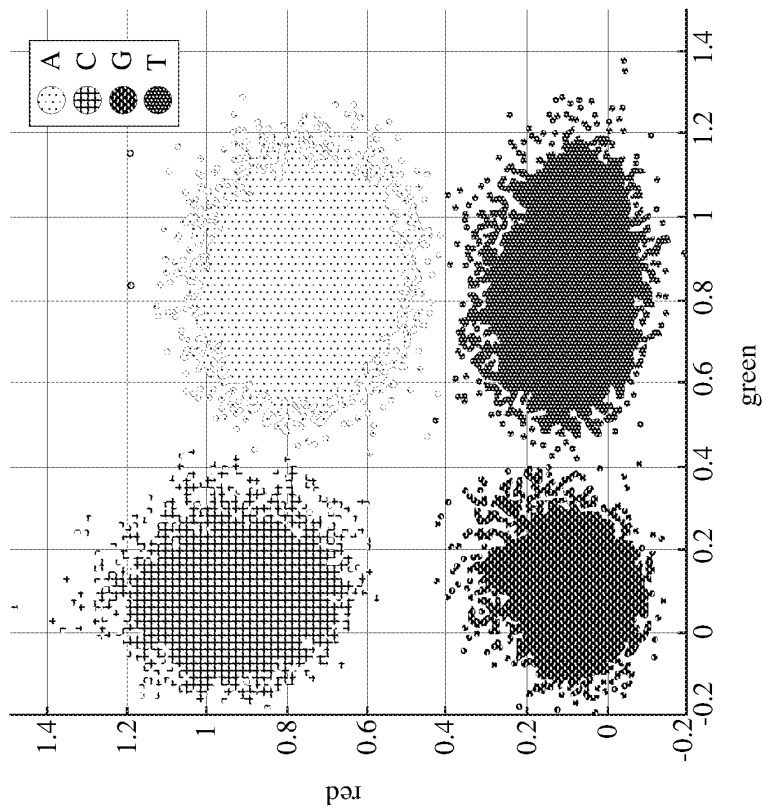


Figure 16

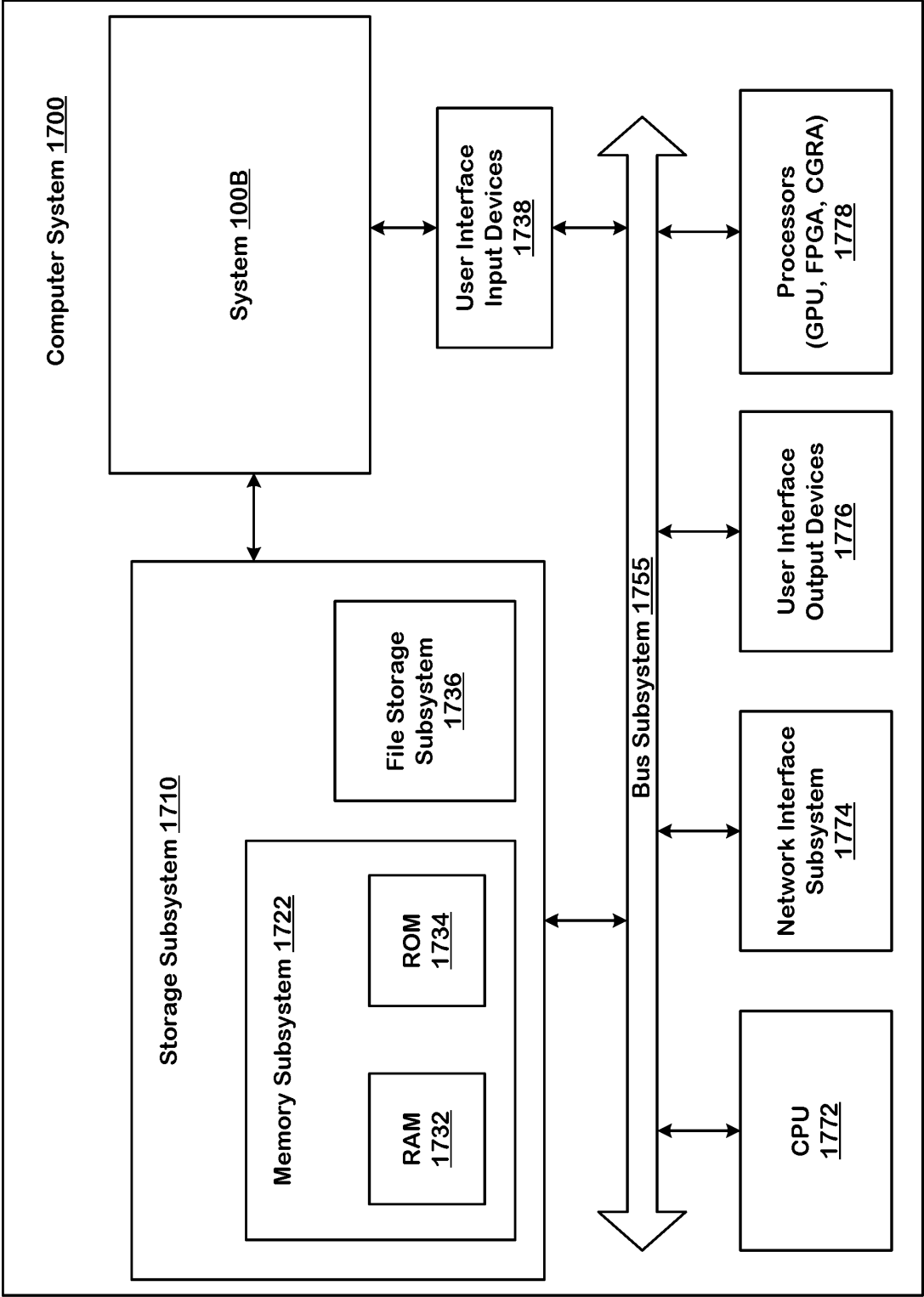


Figure 17

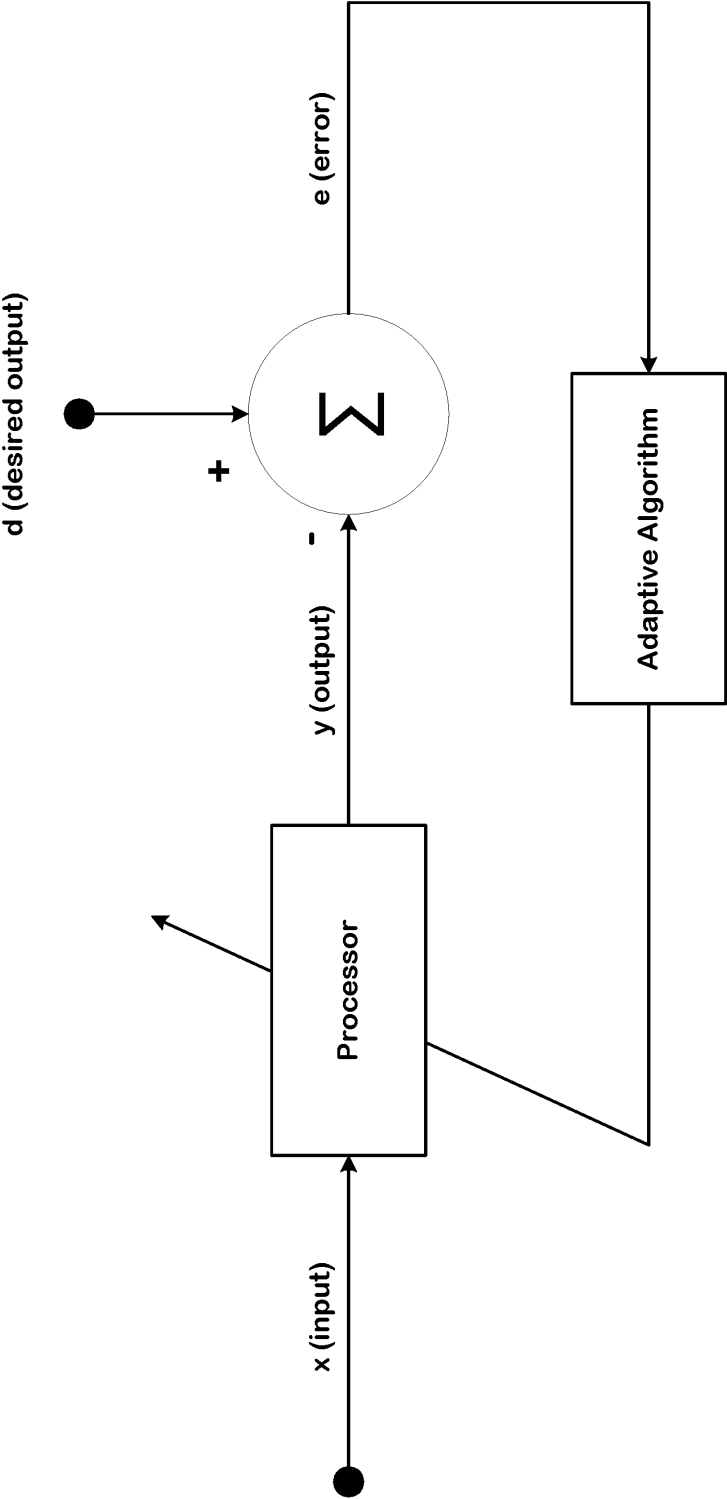
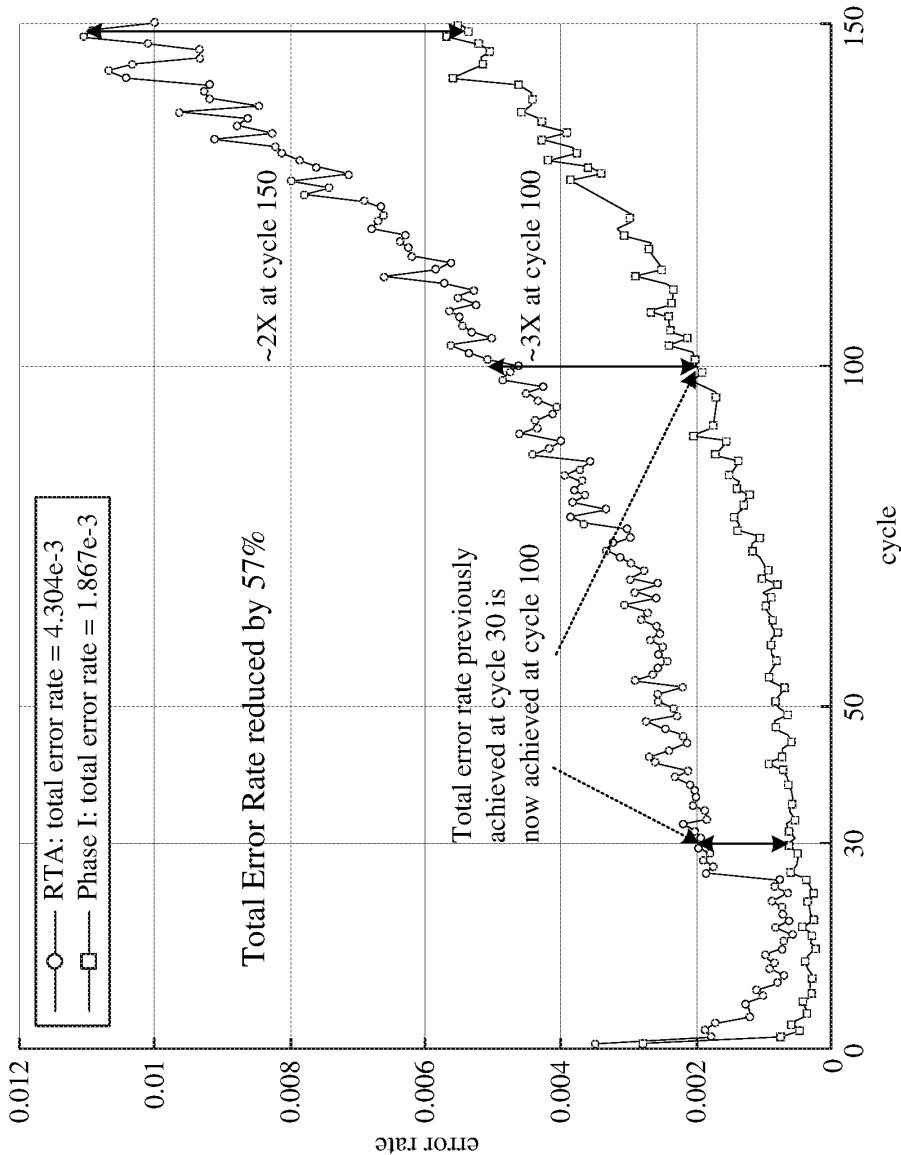
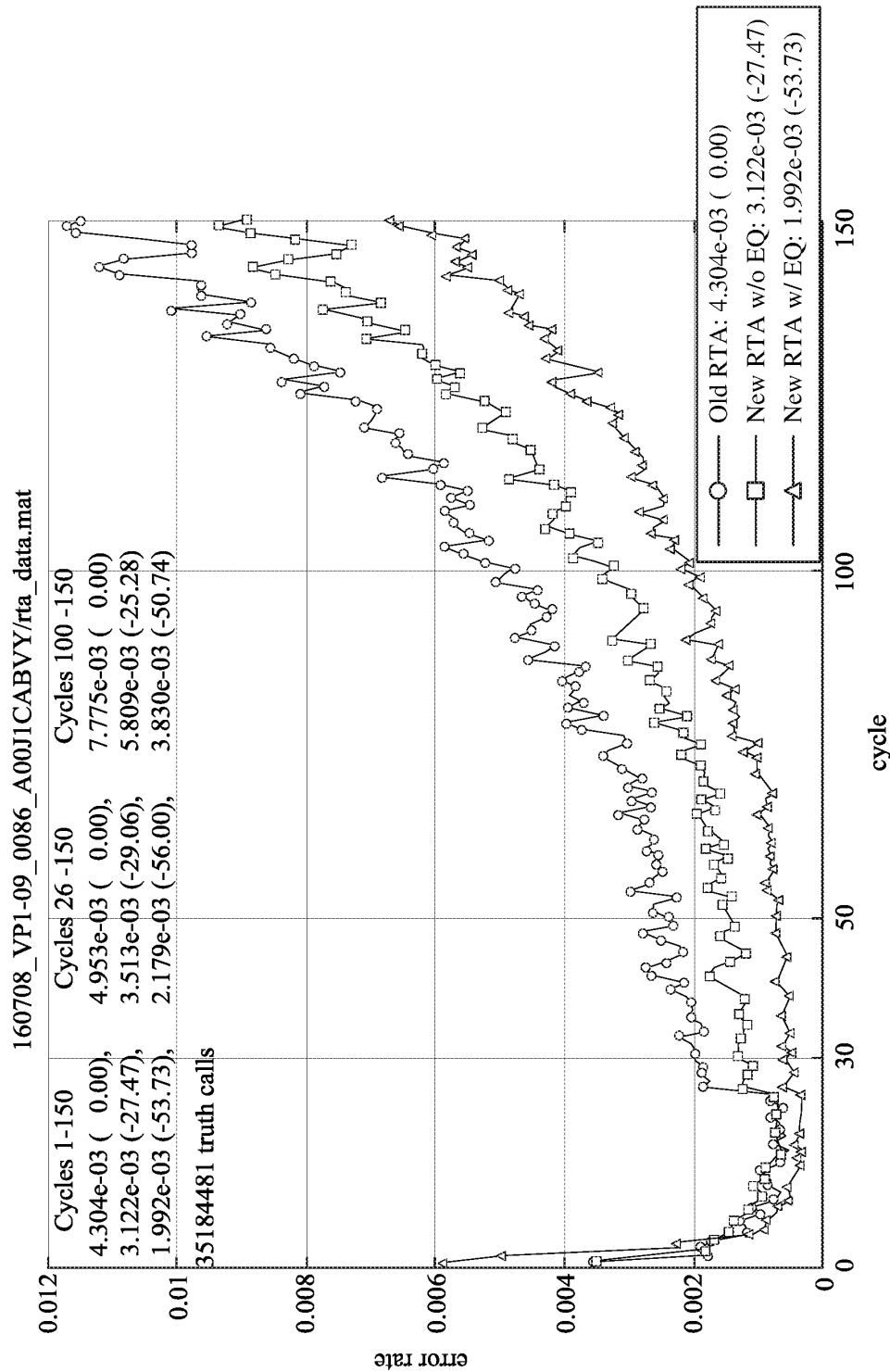


Figure 18



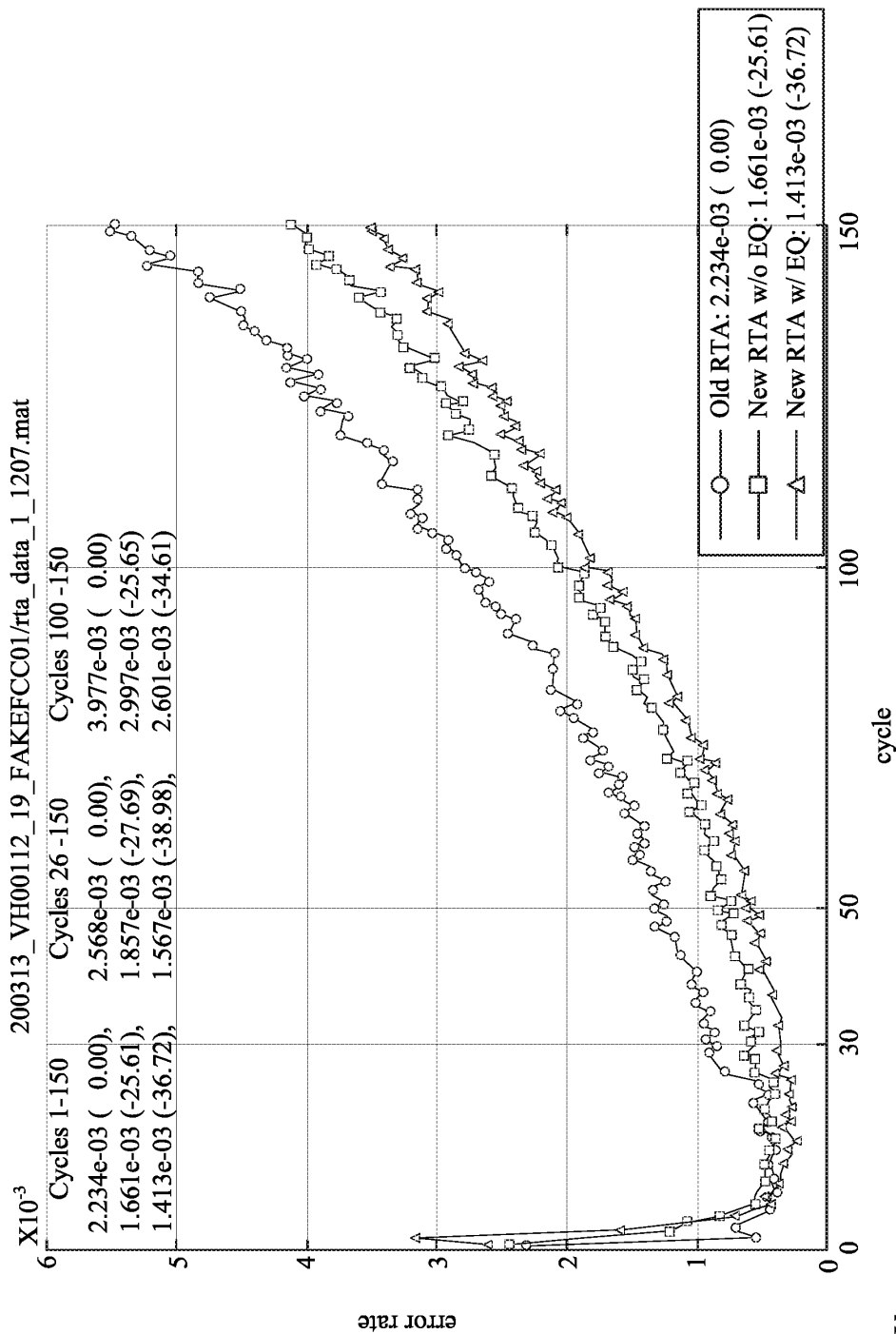
*Data from Novaseq Phi-X run 160708_VP1-09_0086_A00J1CABVY, s_3_1101, chosen because a nearly completed ground truth was available

Figure 19A



- NovaSeq:
 - Large gain from basecaller improvements (channel est + EM details)
 - Large gain from Spatial Equalizer
 - Total Error Rate Reduction of > 50%

Figure 19B-1



- Vega
 - Large gain from basecaller improvements (channel est + EM details)
 - Modest gain from Spatial Equalizer
 - Total Error Rate Reduction of > 35%

Figure 19B-2

Equalizer Primary Analysis Results on NextSeq 2000

Vega Run	Sample	Phi X Error Rate		%PF		%>=Q30	
		Baseline	Equalizer	Baseline	Equalizer	Baseline	Equalizer
200306_VH00106_26	Human	0.367	0.346	79.2	78.9	86.0	86.9
200306_VH00112_14	Human	0.385	0.353	80.5	80.5	85.4	86.6
200306_VH00114_7	Human	0.631	0.505	77.4	77.0	81.4	84.0
200306_VH00118_12	Human	0.403	0.365	81.2	81.1	84.5	85.6

- Implemented in RTA3 and integrated into NextSeq 2000 for full customer release
- 10% decrease in error rate on average with no impact to throughput

Figure 19C

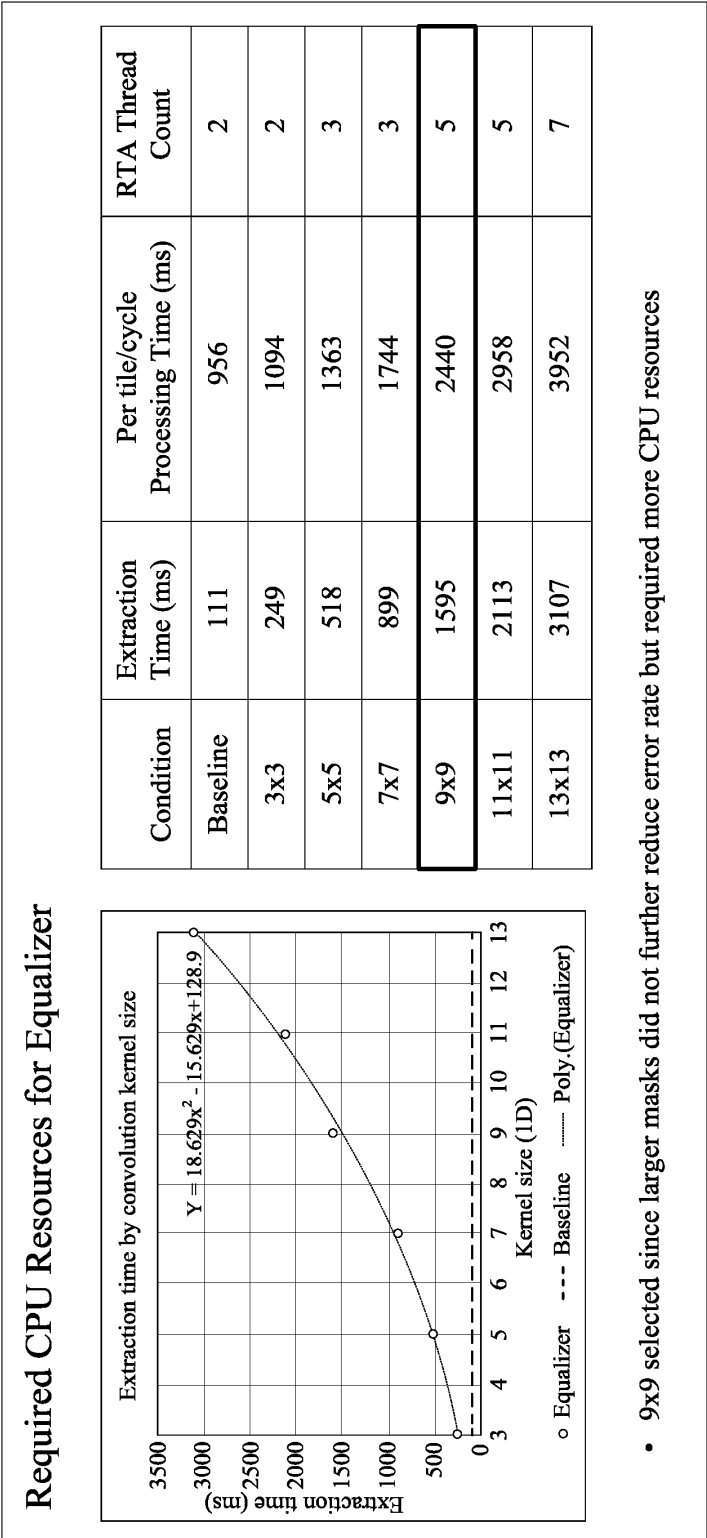


Figure 19D