

Benchmark Report

Apple Cinema Display


Client : Apple Computer

© Pfeiffer Consulting 2000

Reproduction and distribution prohibited without prior written permission

For information contact: [**research@pfeifferreport.com**](mailto:research@pfeifferreport.com)



	Client : Apple Computer	
	Report : Apple Cinema Display Benchmark Report	

About the report

Aim of the technology analysis :

To provide detailed analysis comparing the Apple Cinema Display to standard CRT monitors, with particular focus on display quality and color gamut.

Aim of the productivity benchmarks:

Productivity benchmarks were conducted to document the impact of screen resolution on productivity, using real-world page layout, Web design and image processing task sets.

Web Design

The tests measured creation of a Web page using Adobe Golive and Macromedia Fireworks, as well as link management in Golive.

Page Layout

Page layout productivity tests consisted of building a page and importing and formatting text using stylesheets.

Photo Retouching

Photo retouching benchmarks were based on frequently used options in professional image production: cleaning up high-resolution scans and creating a complex clipping path from a high resolution image.

Test assignments were repeated several times on each display in order to provide reliable results.

For further information contact : research@pfeifferreport.com
Tel.: (33) 01 49 65 05 74 • Fax: (33) 01 42 53 58 03

Monitors tested :

- Apple Cinema Display
- 21-inch Trinitron CRT

Screen resolution used for productivity tests:

- Apple Cinema Display - 1600 x 1024 pixels
- 21-inch Trinitron CRT - 1280 x 960 pixels

Color Measurement

All color measurements and calibration data were produced using the **Gretag-Macbeth Spectrolino** device.

Hardware:

- Power Macintosh G4

System software:

- MacOS 9.0.4

Application software

- Adobe GoLive 4.01
- Macromedia Fireworks 3
- Adobe InDesign 1.5
- Adobe Photoshop 5.5

Results and Charts

Technical Specifications

	21" CRT	Cinema Display
Viewable Screen Area:		
Width	15.35" (39 cm)	18.5" (47 cm)
Height	11.22" (28.5 cm)	11.8" (30 cm)
Diagonal	19.1" (48.5 cm)	22" (55.8 cm)
Overall Size:		
Width	19.5" (49.5 cm)	23.1" (58.7 cm)
Height	19.8" (50.3 cm)	18.9" (47.9 cm)
Depth	19.2" (48.7 cm)	8.3" (21 cm)
Connector:	Standard	Apple Display Connector (compatible with Power Mac G4 and G4 cube)
Luminosity:	104.4 cd per m ²	159.8 cd per m ²
Native White Point:	9200° Kelvin	6500° Kelvin
Native Gamma:	2.07	2.2

Luminosity values based on measurement data from Gretag Macbeth Spectrolino device.

Productivity Benchmarks: Web Design

Web Design (Adobe Golive) - Detailed Comparison (time in seconds):

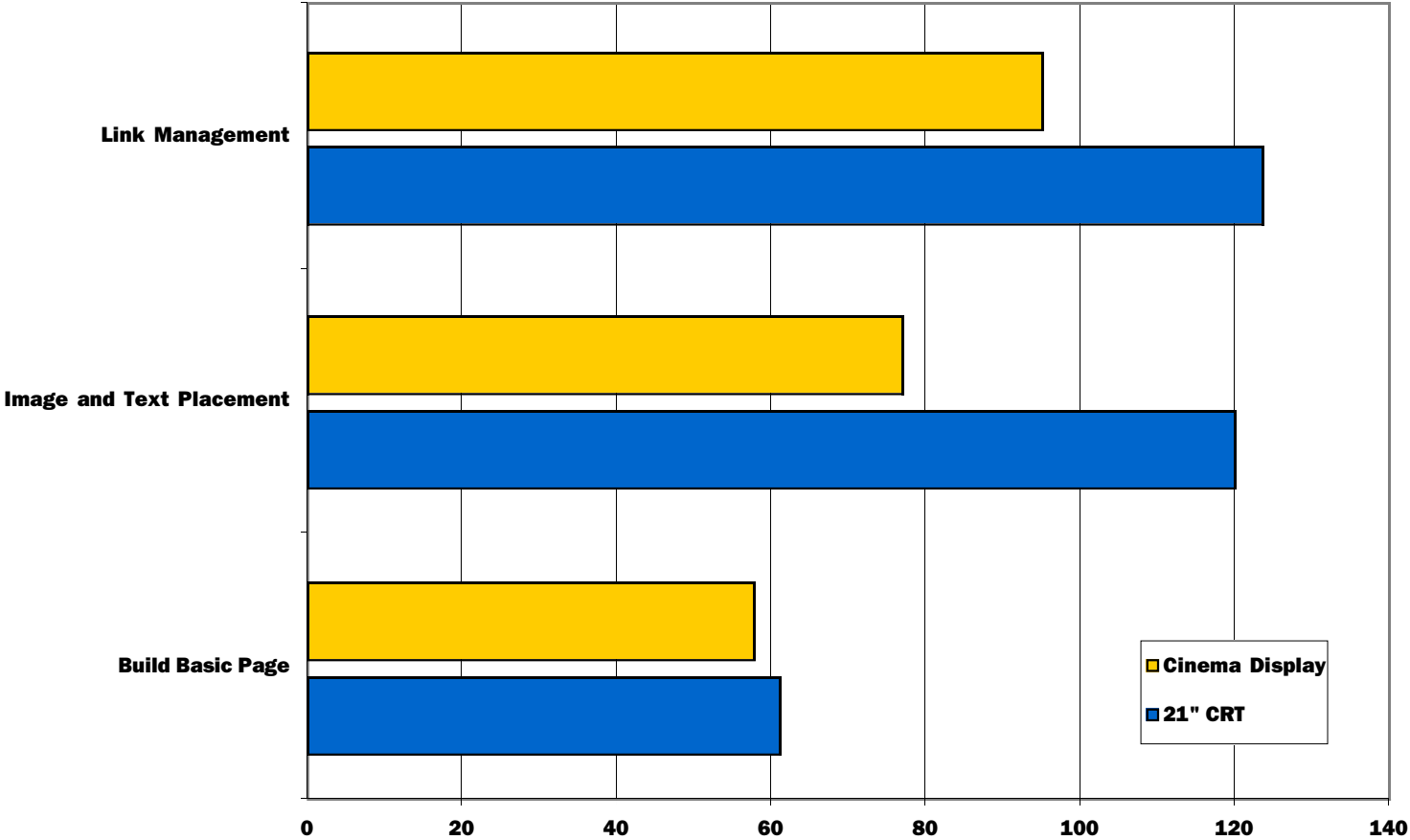
	21" CRT	Cinema Display
Build Basic Page	61.02	57.82
Image and Text Placement	120	77.03
Link Management	123.58	95

Web Design (Adobe Golive) - Overall Comparison (time in seconds):

	21" CRT	Cinema Display
Web Design (Cumulative)	304.6	229.85

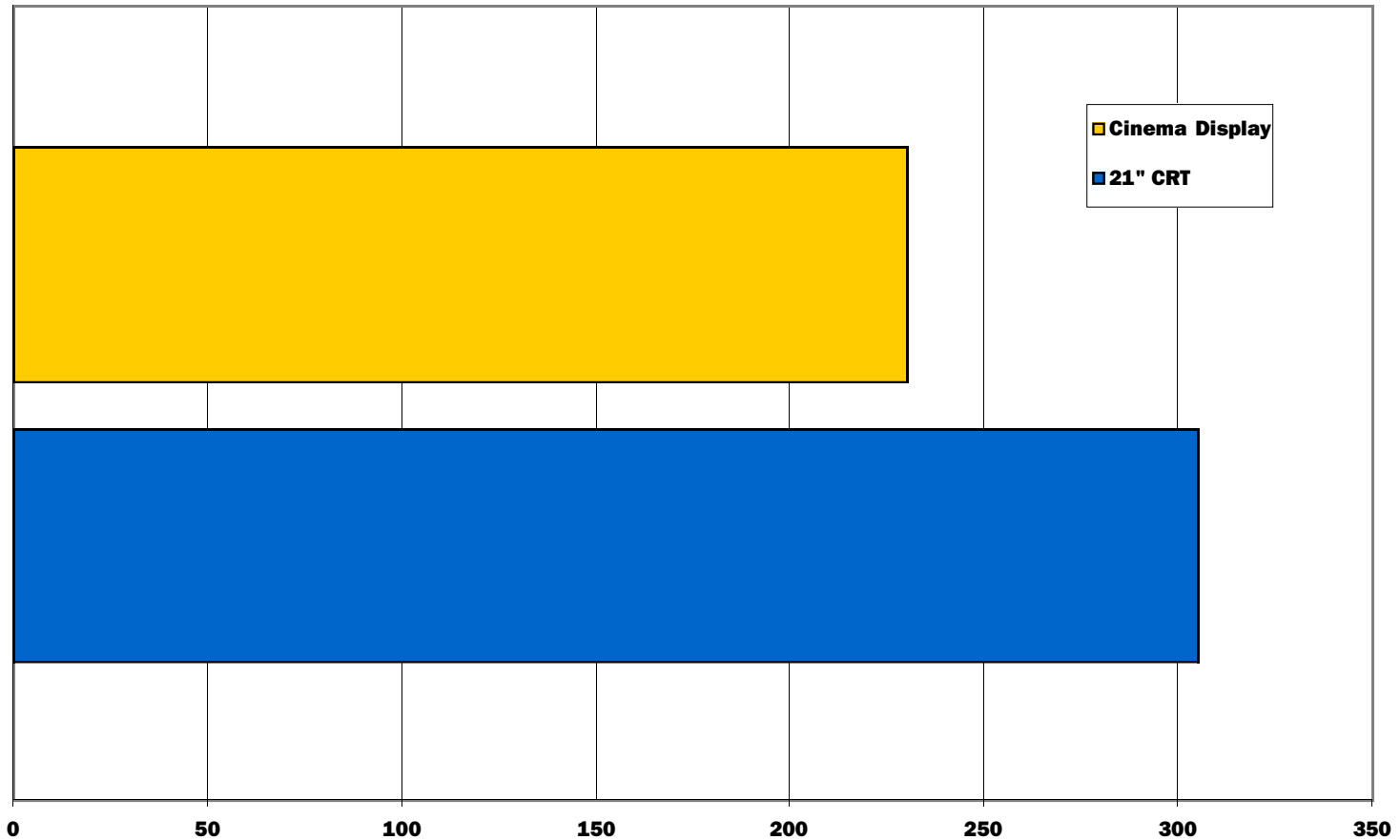
Productivity Benchmarks

Web Design (Adobe GoLive) - Detailed Comparison
(time in seconds - shorter is better)



Productivity Benchmarks

Web Design (Adobe GoLive) - Overall Comparison
(time in seconds - shorter is better)



Productivity Benchmarks: Page Layout

Page Layout (Adobe InDesign) - Detailed Comparison (time in seconds)

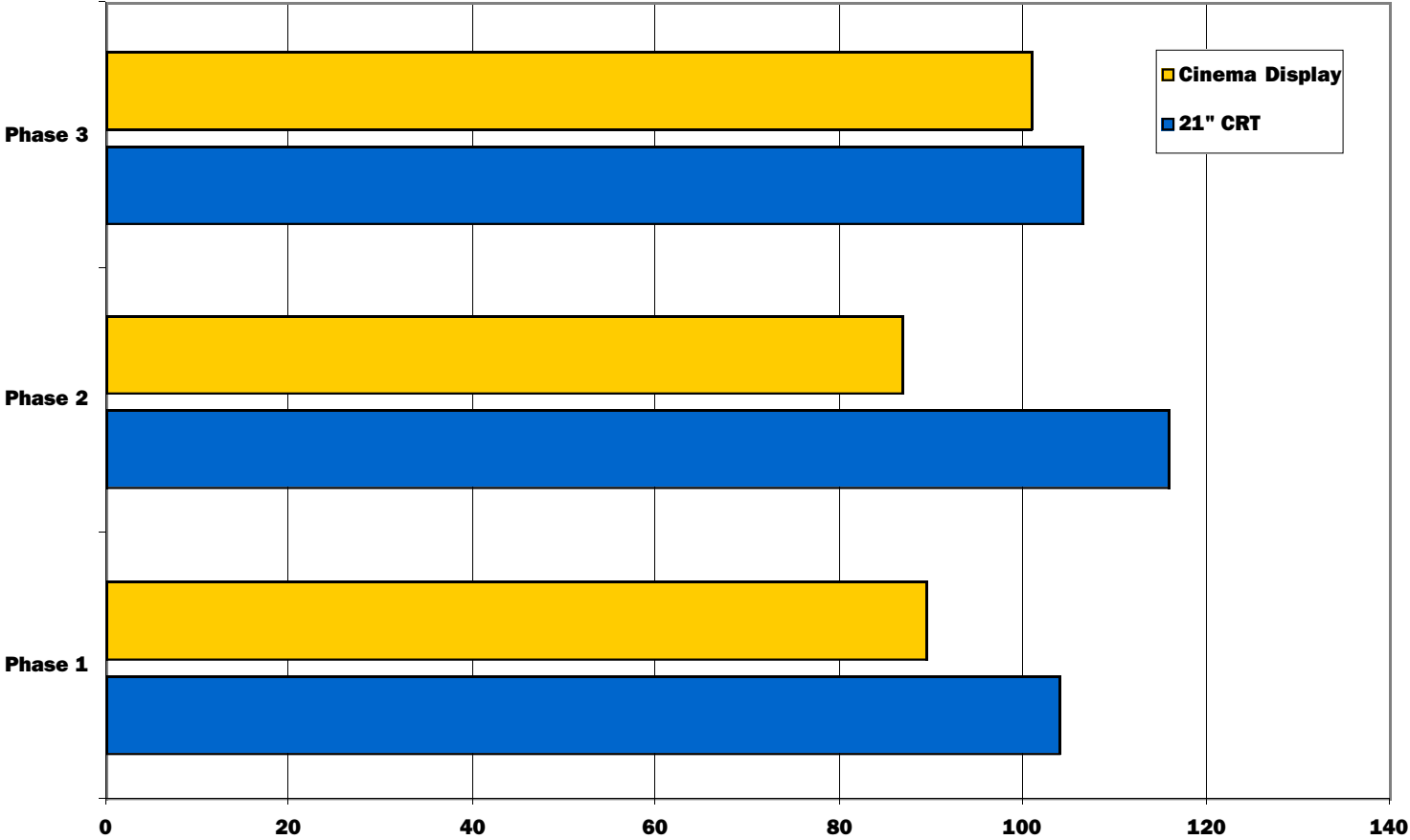
	21" CRT	Cinema Display
Phase 1	103.92	89.41
Phase 2	115.95	86.74
Phase 3	106.61	100.96

Page Layout (Adobe InDesign) - Overall Comparison (time in seconds):

	21" CRT	Cinema Display
Page Layout (Cumulative)	326.48	277.11

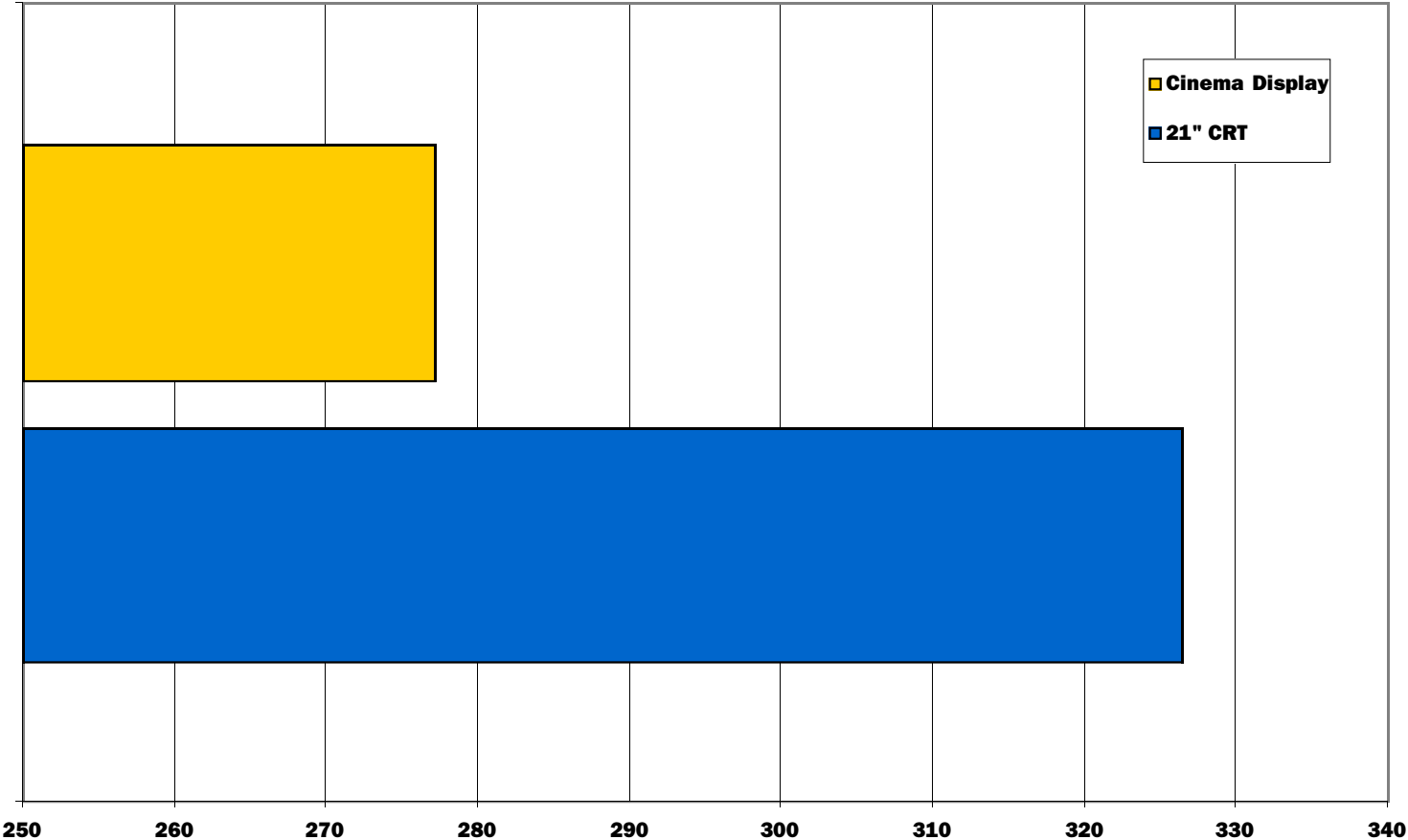
Productivity Benchmarks

Page Layout (Adobe InDesign) - Detailed Comparison
(time in seconds - shorter is better)



Productivity Benchmarks

Page Layout (Adobe InDesign) - Overall Comparison
(time in seconds - shorter is better)



Productivity Benchmarks: Image Processing

Image Processing (Adobe Photoshop) - Detailed Comparison (time in seconds)

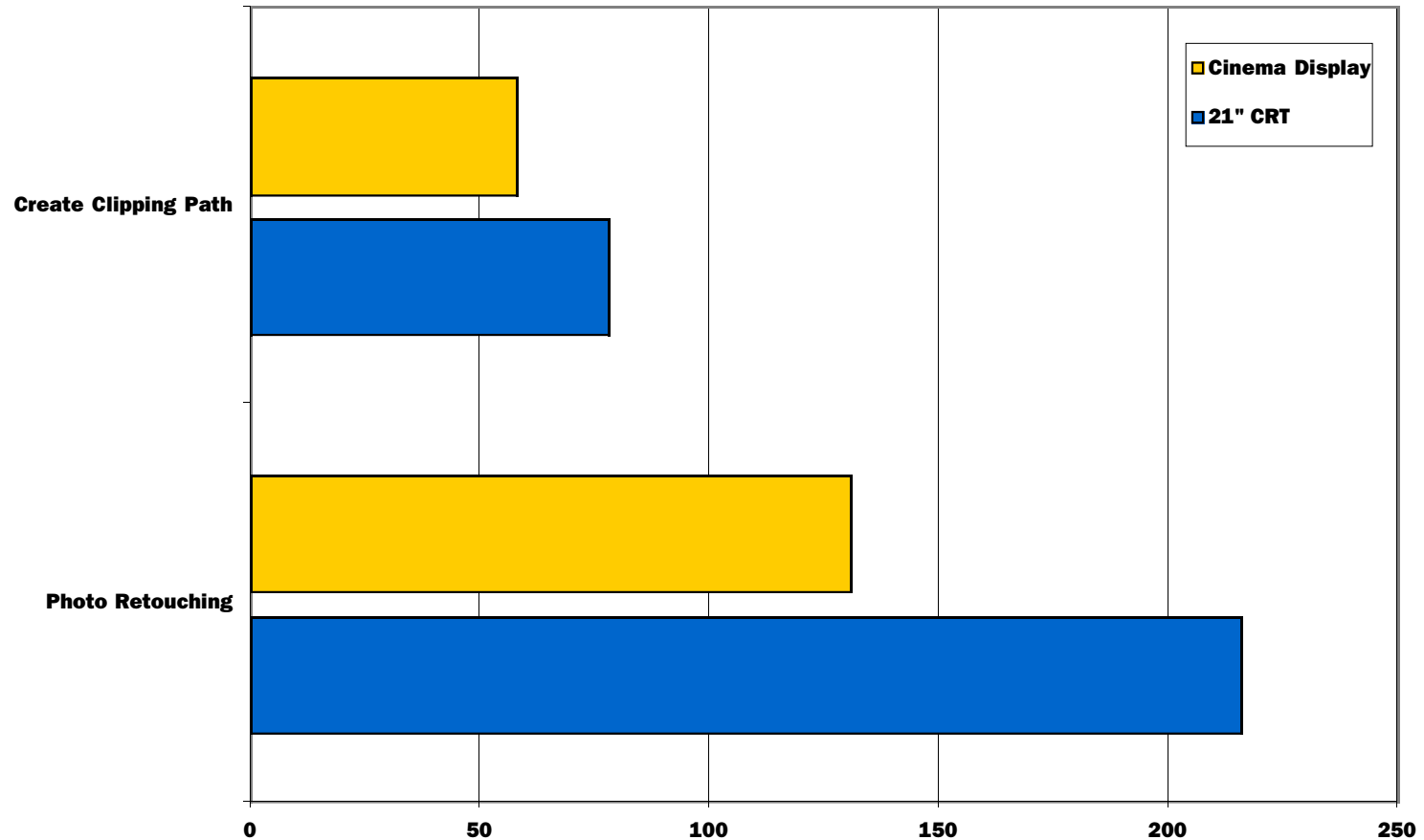
	21" CRT	Cinema Display
Photo Retouching	216	131
Create Clipping Path	78.21	57.89

Image Processing (Adobe Photoshop) - Overall Comparison (time in seconds):

	21" CRT	Cinema Display
Photoshop (Cumulative)	294.21	188.89

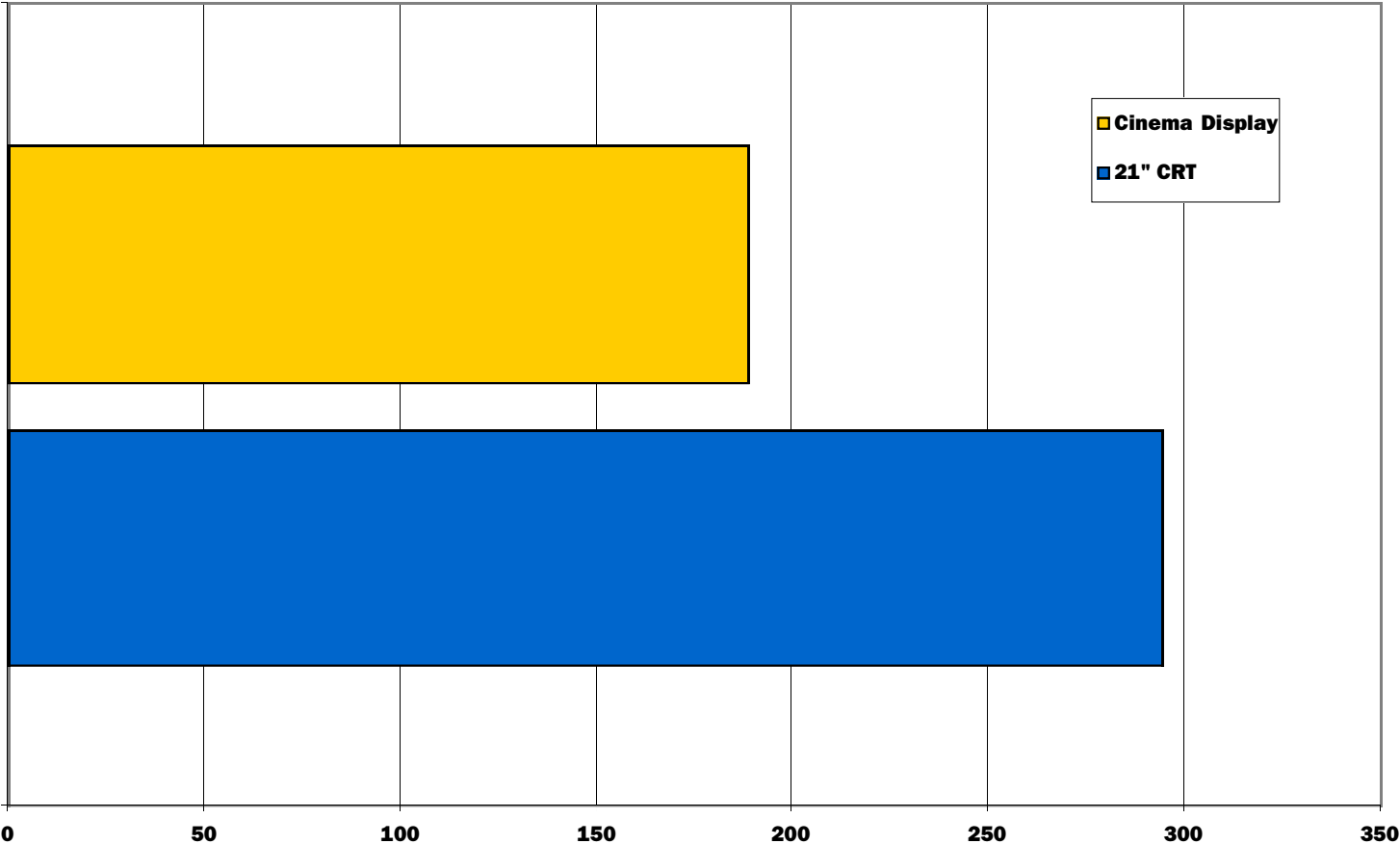
Productivity Benchmarks

Image Processing (Adobe Photoshop) - Detailed Comparison (time in seconds - shorter is better)



Productivity Benchmarks

Image Processing (Adobe Photoshop) - Overall Comparison
(time in seconds - shorter is better)



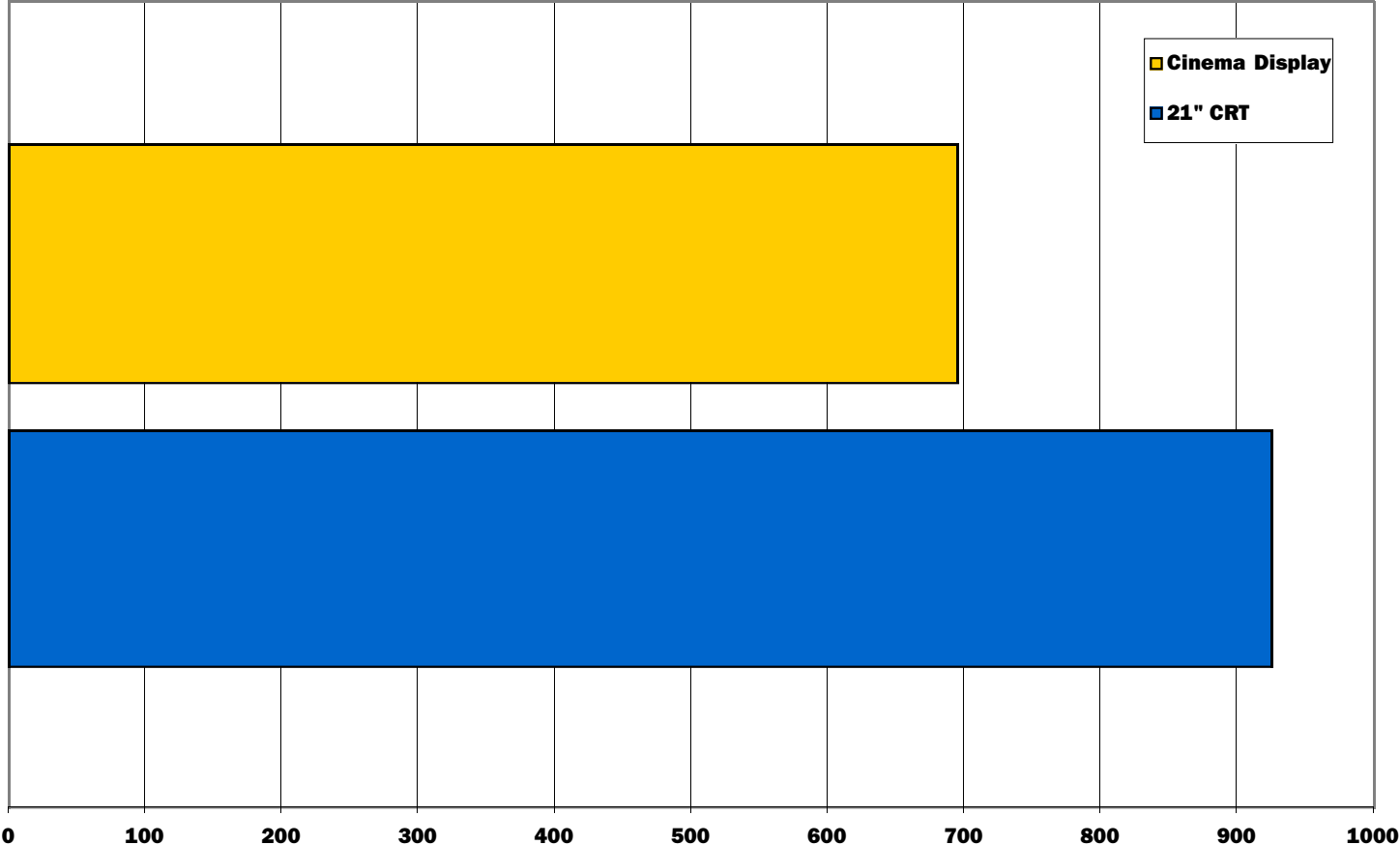
Productivity Benchmarks

Productivity - Overall Comparison (time in seconds)

	21" CRT	Cinema Display
Productivity (Cumulative)	925.29	695.85

Productivity Benchmarks: Overall Comparison

Productivity - Overall Comparison
(time in seconds - shorter is better)



Calibration Data

Calibration Data

CINEMA DISPLAY

INSTRUMENTATION "Spectrolino"
 MEASUREMENT_SOURCE
 Illumination=D50
 ObserverAngle=2°
 WhiteBase=Abs

SampleID	SampleName	XYZ X	XYZ Y	XYZ Z	Lab L	Lab a	Lab b
1	A1	0.28	0.28	0.28	2.51	0.47	-0.96
2	A2	1.59	1.30	6.94	11.29	9.60	-40.60
3	A3	4.84	3.83	23.60	23.09	15.98	-64.38
4	A4	9.87	7.87	49.16	33.70	19.69	-82.61
5	A5	2.37	4.29	0.80	24.61	-29.72	27.30
6	A6	3.66	5.30	7.42	27.57	-19.84	-14.50
7	B1	9.02	15.48	8.73	46.28	-41.51	12.77
8	B2	12.25	17.98	25.23	49.48	-30.84	-21.86
9	B3	17.26	22.00	50.58	54.03	-20.04	-49.18
10	B4	15.84	29.93	4.14	61.59	-60.62	59.99
11	B5	17.09	30.89	10.69	62.41	-57.10	33.98
12	B6	20.32	33.36	27.12	64.45	-49.26	0.67
13	C1	7.51	5.22	23.21	27.36	26.65	-56.29
14	C2	12.44	9.19	48.31	36.35	27.04	-77.07
15	C3	5.05	5.64	0.84	28.50	-4.66	33.39
16	C4	6.35	6.65	7.37	31.01	-0.67	-8.38
17	C5	9.57	9.15	23.72	36.28	6.20	-41.87
18	C6	14.45	13.09	48.63	42.90	11.74	-66.15
19	D1	19.71	23.12	49.90	55.19	-12.31	-46.40
20	D2	18.36	30.98	4.15	62.49	-50.67	61.47
21	D3	19.61	31.94	10.63	63.29	-47.74	35.70
22	D4	22.82	34.42	26.91	65.30	-41.15	2.49
23	D5	27.74	38.38	51.89	68.30	-33.27	-26.02
24	D6	9.99	5.44	0.49	27.95	45.40	38.85
25	E1	12.01	9.29	0.99	36.54	23.23	44.84
26	E2	13.31	10.31	7.46	38.38	24.01	4.00
27	E3	16.49	12.77	23.65	42.41	25.78	-31.17
28	E4	21.38	16.69	48.54	47.86	27.34	-57.48
29	E5	17.26	19.25	2.30	50.98	-6.92	54.82
30	E6	18.52	20.24	8.73	52.11	-5.09	22.84

SampleID	SampleName	XYZ X	XYZ Y	XYZ Z	Lab L	Lab a	Lab b
31	F1	26.51	35.48	10.72	66.12	-28.81	40.27
32	F2	29.71	37.95	26.87	67.98	-24.27	7.19
33	F3	34.60	41.89	51.70	70.79	-18.78	-21.51
34	F4	20.52	11.03	0.73	39.64	58.71	54.58
35	F5	21.79	12.02	7.15	41.25	57.79	10.19
36	F6	24.95	14.46	23.31	44.89	56.16	-26.26
37	G1	26.95	18.29	23.78	49.84	43.12	-18.59
38	G2	31.82	22.21	48.51	54.25	42.74	-46.44
39	G3	27.69	24.72	2.52	56.80	16.08	63.00
40	G4	28.93	25.70	8.92	57.75	16.85	31.88
41	G5	32.11	28.16	25.04	60.03	18.85	-3.32
42	G6	36.99	32.10	49.74	63.42	20.98	-32.02

21-INCH TRINITRON CRT

INSTRUMENTATION "Spectrolino"
MEASUREMENT_SOURCE
Illumination=D50
ObserverAngle=2°
WhiteBase=Abs

SampleID	SampleName	XYZ X	XYZ Y	XYZ Z	Lab L	Lab a	Lab b
1	A1	0.12	0.12	0.19	1.08	0.18	-1.70
2	A2	3.44	1.78	17.66	14.26	34.21	-67.47
3	A3	11.31	5.66	59.04	28.53	52.83	-102.12
4	A4	6.25	12.43	1.95	41.89	-48.68	42.40
5	A5	9.57	14.02	19.58	44.27	-28.25	-19.93
6	A6	17.41	17.81	61.11	49.27	1.26	-68.43
7	B1	20.99	42.32	6.33	71.09	-74.61	65.16
8	B2	24.33	43.94	24.10	72.19	-64.18	19.33
9	B3	32.18	47.61	66.02	74.58	-43.59	-29.52
10	B4	8.08	4.41	0.53	24.97	42.18	32.99
11	B5	11.41	6.05	18.21	29.54	49.18	-42.35
12	B6	19.35	9.98	59.99	37.80	60.82	-87.10
13	C1	14.22	16.76	2.29	47.96	-11.49	49.72
14	C2	17.49	18.34	19.99	49.90	-1.00	-11.07
15	C3	25.38	22.18	61.82	54.22	17.80	-60.60
16	C4	29.04	46.93	6.72	74.15	-53.42	68.73
17	C5	32.42	48.60	24.59	75.20	-45.44	23.64
18	C6	40.27	52.24	66.74	77.42	-28.94	-25.29
19	D1	27.79	15.02	1.41	45.66	64.48	54.77
20	D2	31.18	16.69	19.17	47.87	67.88	-12.84

SampleID	SampleName	XYZ X	XYZ Y	XYZ Z	Lab L	Lab a	Lab b2
21	D3	39.14	20.62	61.32	52.53	74.81	-63.01
22	D4	33.98	27.47	3.20	59.41	28.13	62.35
23	D5	37.47	29.25	21.14	61.00	32.99	5.71
24	D6	45.40	33.10	63.48	64.24	43.11	-44.93
25	E1	48.94	58.02	7.68	80.75	-18.19	76.17
26	E2	52.44	59.78	25.76	81.72	-13.08	32.79
27	E3	60.41	63.59	68.43	83.75	-2.11	-15.94
28	E4	0.40	0.27	1.48	2.45	5.69	-20.53
29	E5	1.11	0.62	5.27	5.61	19.88	-42.67
30	E6	5.11	2.60	26.33	18.36	39.74	-77.44
31	F1	7.02	3.55	36.33	22.12	44.44	-86.45
32	F2	9.08	4.57	47.27	25.49	48.70	-94.59
33	F3	0.60	1.06	0.31	9.47	-16.38	10.38
34	F4	1.91	3.69	0.67	22.61	-31.05	26.25
35	F5	9.33	18.62	2.82	50.24	-55.98	49.34
36	F6	12.81	25.67	3.83	57.72	-62.62	55.19
37	G1	16.76	33.69	5.00	64.72	-68.90	60.59
38	G2	0.78	0.48	0.23	4.32	12.74	3.12
39	G3	2.46	1.38	0.29	11.84	27.12	15.02
40	G4	12.11	6.57	0.68	30.80	48.64	40.35
41	G5	16.78	9.07	0.89	36.13	54.46	45.72
42	G6	22.18	11.97	1.14	41.18	59.92	50.60