

Benchmark Test Results for Two OS/2 2.0 Video Device Drivers

Benchmark performed using PMBench 1.0 by PC Labs (Nov. 1989)  
 The new TSENG 1024x768x256 device driver for OS/2 2.0 (service pack) seemed much slower than the 1024x768x16 version I had been using before the service pack, so I decided to measure just how much slower it actually is. Here are the results. I ran the tests using a Gateway 2000 486-33 and a Diamond Speedstar video board. My machine has 32MB of RAM on the motherboard. I stopped all other programs from running (clock, screen saver, etc.) before running the tests. I had PM Bench compute times using 10 repetitions of each test.

Although I had expected a slowdown going from 4-bit to 8-bit color, I also expected a speed increase due to the 32-bit operation of the 256 color driver. Based upon this benchmark, I would have to say that the new device driver is not written as optimally as the one I had been using. I don't know enough about the internals of the video device drivers to make any real educated guesses, so I will leave it up to others, who are more familiar with OS/2 video device drivers, to draw some conclusions.

All times are in milliseconds.

	1024x768x16 16 bit driver	1024x768x256 32 bit driver	% Slower	
<b>BITBLT ALIGNMENT</b>				
Source Aligned Destination Aligned:				
32 x 32	1.25	2.00	60	16 bit driver performed best when source and destination were both aligned.
64 x 64	3.25	7.00	115	
128x128	8.00	27.00	238	
256x256	25.50	107.25	321	
Source Aligned Destination Not Aligned:				32 bit driver performs the same on all BITBLT's regardless of alignment. Slowdown figures are pretty good for non-aligned BITBLT's, not so good for aligned BITBLT's.
32 x 32	2.25	2.00	-11	
64 x 64	6.25	7.00	12	
128x128	22.00	27.75	26	
256x256	82.25	109.25	33	
Source Not Aligned Destination Aligned:				
32 x 32	2.00	2.00	0	

64 x 64	6.50	7.00	8
128x128	21.75	27.25	25
256x256	82.75	108.25	31
Source Not Aligned Destination Not Aligned:			
32 x 32	2.25	2.00	-11
64 x 64	6.75	7.26	8
128x128	22.50	28.00	24
256x256	83.26	110.26	32

BITBLT OVERLAP

Horizontal Overlap:	3.14	7.08	125
Vertical Overlap:	3.13	7.08	126

BITBLT ROP'S (average time per call)

Screen to Screen:			
SRCCOPY	3.16	7.01	122
SRCPAINT	7.58	11.81	56
SRCAND	9.47	12.00	27
SRCINVERT	9.53	11.99	26
SRCERASE	7.83	12.18	56
NOTSRCCOPY	5.75	7.77	35
NOTSRCERASE	9.60	12.18	27
MERGECOPY	7.83	8.97	15
MERGEPAINT	7.64	11.99	57
PATCOPY	1.01	3.28	225
PATPAINT	9.91	12.56	27
PATINVERT	1.26	6.63	426
DSTINVERT	1.14	6.50	470
ZERO	1.01	3.22	219
ONE	0.95	3.28	245

Wow! Not good for the inverted cursor functions.  
Not good for solid fills, either. No wonder my OS/2 windows are slow.

Memory to Screen:

SRCCOPY	0.76	3.66	382
SRCPAINT	5.81	7.89	36
SRCAND	5.75	7.89	37
SRCINVERT	5.81	7.83	35
SRCERASE	6.00	8.14	36

NOTSRCCOPY	3.85	3.79	-2
NOTSRCERASE	5.93	8.08	36
MERGECOPY	4.11	4.23	3
MERGEPAINT	5.81	7.89	36
PATCOPY	1.01	3.35	232
PATPAINT	6.12	8.14	33
PATINVERT	1.26	6.63	426
DSTINVERT	1.14	6.57	476
ZERO	0.95	3.28	245
ONE	1.01	3.35	232

It's interesting how some values don't look too bad, yet others seem to be ridiculously high.

Memory to Memory:

SRCCOPY	0.32	0.32	0
SRCPAINT	0.51	0.51	0
SRCAND	0.51	0.44	-14
SRGINVERT	0.51	0.51	0
SRCERASE	0.51	0.51	0
NOTSRCCOPY	0.51	0.44	-14
NOTSRCERASE	0.51	0.51	0
MERGECOPY	0.57	0.51	-11
MERGEPAINT	0.51	0.44	-14
PATCOPY	0.32	0.38	19
PATPAINT	0.57	0.51	-11
PATINVERT	0.44	0.44	0
DSTINVERT	0.44	0.38	-14
ZERO	0.32	0.32	0
ONE	0.32	0.32	0

Look how good all of these are!!!!  
I bet the layering of the video pages has alot to do with the difference between the 16 color and 256 color speeds.

There is a big difference between the memory map for 4-bit color and 8-bit color modes.

SCREEN/MEMORY BITBLT (64x64 mono)			
Memory To Screen:	0.84	3.47	313
Screen To Screen:	5.89	6.73	14

Hmmm. Also pretty interesting!

PARTIAL ARCS			
Unit Circle	1.56	1.37	-12
Major Axis X	1.82	1.56	-14
Major Axis Y	1.43	1.17	-18
Tilted	1.69	1.37	-19

Greased lightning on the arcs.  
Should be good for ATM fonts.

## FULL ARCS

### Outlined:

Unit Circle	5.11	4.55	-11
Major Axis X	6.82	6.25	-8
Major Axis Y	3.98	3.42	-14
Tilted	5.67	4.55	-20

### Filled:

Unit Circle	21.02	24.44	16
Major Axis X	25.00	42.05	68
Major Axis Y	18.75	16.47	-12
Tilted	23.29	26.15	12

A little odd that he should be slow.  
Look for more horizontal problems later.

## POLYSPLINES (Ten splines per call)

	15.00	13.72	-9
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More good news for ATM fonts.

## POLYFILLETS (Five fillets per call)

	17.81	16.25	-9
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## SINGLE LINES

Horizontal	0.44	1.06	141
Vertical	1.56	1.25	-20
Diagonal	3.31	2.25	-32

Too bad we use horizontal lines  
so much!

## POLYLINES

Solid:			
Horizontal	50.00	187.40	275
Vertical	262.60	225.00	-14
Diagonal	606.20	412.60	-32

More horizontal line slowdowns.

## LINES ALL DIRECTIONS

Long	1.03	0.76	-26
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Good news for graphics packages.

## WIDE LINES

Solid			
Width 3	10.25	7.74	-24
Width 5	13.25	9.00	-32

I bet Corel Draw people will like these figures.

Width 10	14.00	8.25	-41
Width 20	12.50	11.00	-12
Patterned:			
Width 3	13.00	8.50	-35
Width 5	14.75	9.50	-36
Width 10	15.75	13.25	-16
Width 20	20.50	17.75	-13

AREA ALTERNATE FILL

	213.76	218.12	2
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AREA WINDING FILL

	426.88	486.24	14
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RECTANGLE BOUNDRY & INTERIOR

Square Corners	6.50	28.56	339
Rounded Corners	23.00	40.13	74

I bet these figures also have alot to do with horizontal slowdowns.

RANDOM RECTANGLES

	7.84	36.28	363
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PATTERNS

DEFAULT	81.20	575.00	608
DENSE1	681.40	768.60	13
DENSE2	681.40	862.40	27
DENSE3	693.80	1043.80	50
DENSE4	693.60	968.60	40
DENSE5	687.60	900.00	31
DENSE6	693.80	825.00	19
DENSE7	693.60	756.40	9
DENSE8	356.20	387.60	9
VERT	693.80	756.40	9
HORIZ	193.80	187.60	-3
DIAG1	693.60	681.20	-2
DIAG2	687.60	750.00	9
DIAG3	693.80	681.20	-2
DIAG4	693.60	750.00	8

Kind of scary when your DEFAULT performance gets 600% slower

It's nice to see the good times on the rest of the patterns, though.

NOSHAE	25.00	18.60	-26		
IMAGE FONTS					
Swiss 12 pt 8w 20h 80 ch	6.12	7.81	28	Overall, pretty good performance on bitmapped fonts.	
Swiss 10 pt 6w 12h 80 ch	3.13	3.63	16		
Swiss 12 pt 7w 15h 80 ch	4.38	5.50	26		
Swiss 14 pt 8w 18h 80 ch	5.94	7.19	21		
Swiss 18 pt 10w 22h 80 c	8.38	9.25	10		
Swiss 24 pt 14w 28h 70 c	12.31	14.00	14		
Swiss 8 pt 5w 13h 80 ch	2.81	3.56	27		
Swiss 10 pt 6w 16h 80 ch	3.94	4.38	11		
Swiss 12 pt 7w 20h 80 ch	5.56	6.94	25		
Swiss 14 pt 8w 24h 80 ch	7.56	9.19	22		
Swiss 18 pt 11w 29h 80 c	10.88	11.56	6	No benchmark for ATM fonts. This program was pre-ATM.	
Swiss 24 pt 14w 37h 70 c	15.94	17.75	11		
Swiss 8 pt 6w 10h 80 ch	2.81	3.19	14		
Swiss 10 pt 7w 12h 80 ch	3.81	5.06	33		
Swiss 12 pt 9w 15h 80 ch	5.31	6.25	18		
MIXED FONTS	9.90	10.68	8		
GREYED TEXT (9 Characters)	2.31	5.44	135		
TEXT - BACKGROUND MIXED					
LeaveAlone	6.12	7.75	27		Not good since this is typically used!
OverPaint	2.75	14.50	427		
EXTENDED TEXT	4.17	3.91	-6		
SET/QUERY CURRENT POSITION					
Set	0.08	0.05	-38		
Query	0.14	0.09	-36		
MARKERS SYMBOLS (100 markers)					

DEFAULT	23.74	21.26	-10	Good for Lotus!
EIGHT POINT STA	23.74	23.14	-3	
SOLID DIAMOND	23.74	19.38	-18	
DOT	23.76	20.62	-13	
SMALL CIRCLE	23.76	23.76	0	
STRETCH BLT				
32 x 32	7.50	2.50	-67	Good times for bitmap stretching!
43 x 48	10.00	5.00	-50	
80 x 80	15.62	14.38	-8	
96 x 96	19.38	20.00	3	
192x192	49.36	75.00	52	
32 x 48	9.38	3.74	-60	
48 x 96	13.76	10.00	-27	
48 x 32	8.14	3.76	-54	
108x 96	21.88	22.50	3	
21 x 21	6.24	1.26	-80	
105x105	22.50	23.76	6	
IMAGE DATA	10.77	5.88	-45	
PULL DOWN MENUS	60.25	100.69	67	A little slow here, but not too bad.
DIALOG BOXES (Show & Destroy)	445.64	924.38	107	Could be better. I bet it's the fills.
RUBBER BANDING	3.88	6.06	56	
SCROLL WINDOW				
Byte Aligned	40.19	164.87	310	#2 choice for optimizations.
Not Aligned	52.19	166.69	219	
ERASE WINDOW	82.50	579.50	602	#1 choice for optimizations.

COMPLEX CLIPPING

BitBit	0.71	0.58	-18
Lines	3.29	1.54	-53
Text	62.75	49.88	-21

REGION CLIPPING

BitBit	0.33	0.92	179
Lines	2.48	1.02	-59
Text	4.50	4.38	-3

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