

Smalltalk-80 for the 80386 PC

Performance

Compared with the Tektronix 4405/4406 execution time are 75-90% faster on the Everex Step 20 (20Mhz 80386). For heavily display oriented operations, performance equivalent unless ESL card is used, then the Step 20 is 19% faster. PEP 301 performance is about 20% less than the Step 20, but display speeds are similar.

Smalltalk-386 requires an EGA (640x350 pixels) or VGA (640x480) display. With "Enhanced EGA" or "Enhanced VGA" controllers, and an appropriate multi-synchronous monitor, resolutions up to 800x600 are available. The ESL display card, which is used in addition to an EGA card, supplies 800x600 resolution with four times the bitblt speed making it attractive for animation.

System Requirements

80386 based "PC/AT" with 80387 co-processor, two megabytes of RAM plus RAM equal to the image size, hard disk drive, 3 button mouse (Mouse Systems and Logitech tested), EGA or VGA display system. Smalltalk-386 runs under the MS-DOS (or PC-DOS) operating system.

Features

Implements full Tektronix Smalltalk-80 image except for that portion of the operating system interface which does not apply to MS-DOS. Applications can use the full extended IBM keyboard. FileSystem adapted to MS-DOS. There is DOS shell support. DOS programs can be executed with input and output "piped" to Smalltalk streams. Display hardcopies can be made to Tektronix 4696 color printer or Epson compatible black and white printer at any time using "Print Screen" key. Arbitrary software interrupts can be executed allowing access to device drivers. System is configured to various display devices via the DOS "set" command.

What about Digital Smalltalk/V286?

The Smalltalk image used by Digital is a small and inconsistent subset of the Smalltalk-80 image. Smalltalk-386 has somewhat faster execution, much faster for graphic operations, and performance in color degrades 0-50% as compared with 300%. Smalltalk-386 has better DOS file interfacing. Smalltalk-386 can take advantage of higher resolution display drivers.

The ESL Display Controller

Conventional EGA/VGA controllers prove to be a significant impediment to achieving high speed display performance. Because of the internal display management done by Smalltalk, we determined that an alternate display scheme would greatly increase the performance of Smalltalk-386. As a display controller the board is very dumb, but as system memory it is exceedingly fast. The contents of the memory simply ends up getting rasterized out to the display, and the CPU does not suffer the data transfer bottleneck imposed by the 8-bit, multiple-wait-state access incurred with conventional controllers. In addition, the bit ordering is "little-endian", matching the processor so that bitblt display manipulation can be done 32 bits at a time instead of 8. Compatibility with EGA is obtained by providing a feed-through of the existing EGA signals through the ESL controller and selection of the desired output as appropriate.

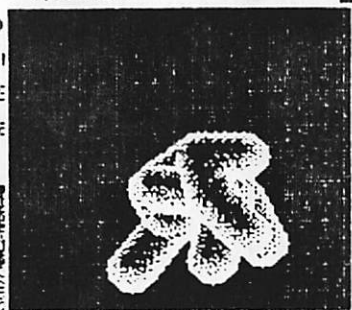
Further information?

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System Transcript

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PICTURES

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Toothpaste Graphics -- in color

