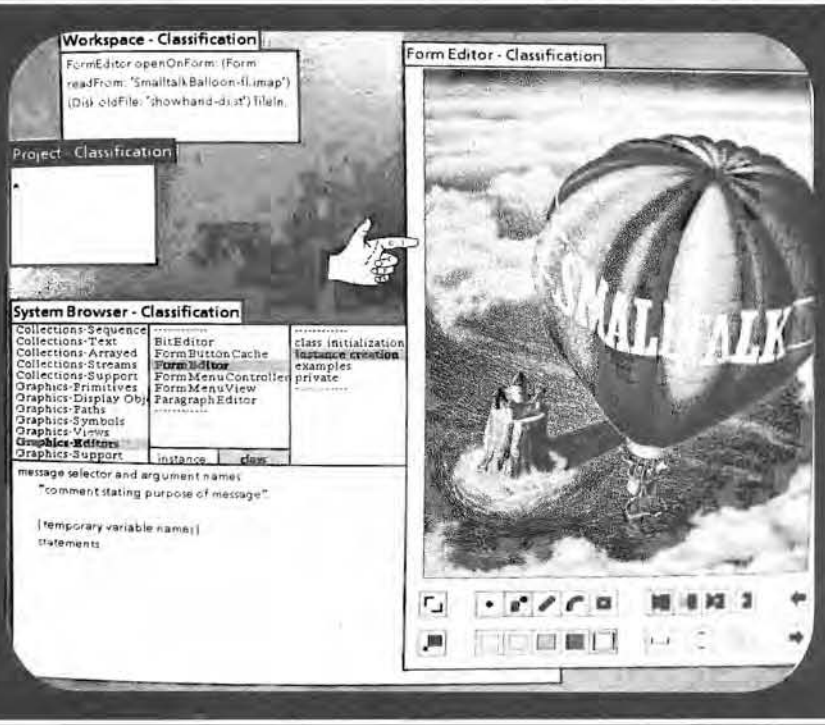
The Xerox 1100 Smalltalk-80™ System

An Integrated Programming Environment



The Smalltalk-80 is a personal, integrated, interactive environment ideally suited to exploratory programming and prototype development. It is the result of 10 years of research and development by the Software Concepts Group of the Xerox Palo Alto Research Center (PARC).

The Xerox 1100 Smalltalk-80 completely implements the Smalltalk-80 environment,* and takes full advantage of the Xerox 1100 advanced hardware capabilities.

Environment. The Xerox 1100 Smalltalk-80 environment provides integrated, interactive text and graphics editors, compiler, source level debugger, and management of multiple views and dynamic memory.

Interactive. Smalltalk-80 environment is interactive. The Xerox 1100 implementation takes full advantage of the large bit-mapped display, keyboard, and unique pointing device, called a *mouse*. The system provides for the scheduling and manipulation of *multiple, overlapping views* of display data.

Using the mouse, a programmer can point to text and select actions from *pop-up menus*. An extensive set of graphical facilities is available to support the construction of interactive applications.

Object-oriented. Smalltalk-80 is a powerful interactive language based on the idea of *objects* that communicate by sending and receiving *messages*. Every Smalltalk object is an instance of some *class*. Classes are organized hierarchically, so that a new class is normally defined as a subclass of an existing class. The subclass inherits the instance storage requirements and message protocol of its superclass. It may add new information of its own, and may override inherited responses to messages.

The notion of class provides a uniform framework for defining and protecting system objects and encourages a logical, hierarchical program structure.

*As described in the August 1981 issue of Byte magazine and *Smalltalk-80: The Language and Its Implementation,* by Adele Goldberg and Dave Robson, Addison Wesley, 1982.

Browsing. All Smalltalk-80 sources are accessible for viewing and modification by means of a view called a *Browser.* A Browser displays the system class structure and allows the user to move through the structure by pointing with the mouse. The Browser provides facilities for managing incremental changes to the system in a formalized way.

Text Editing. Text editing throughout the system is carried out by a simple *cut and paste* metaphor. The same text editor is used for document creation and class development.

Graphics Editing. An extensive graphics package is included that provides for the creation and manipulation of bit images, lines, and curves.

Debugger. The source level debugger allows the display and modification of code and data. The current point of execution is highlighted in the original source text, and variable values can be inspected simply by pointing with the mouse.

Processes. The Smalltalk-80 system includes a high-level process scheduler capable of managing many independent processes controlled by external or system-derived signals.

Performance Measurement Tools. Performance can be analyzed to provide a percentage breakdown of execution time in a given application. The presentation in terms of calling sequence makes it easy to locate performance bottlenecks.

Technical Information

- Integrated environment
- All system facilities available to user
- Text editor
- Graphics editor
- Class/instance model with inheritance
- Incremental compilation/dynamic binding
- Source language debugger
- Browser/incremental change management
- Graphical presentation through overlapping windows
- Input from a keyboard, a pointing device, and menus
- Dynamic memory management/reference counted garbage collection
- Performance measurement tools
- Library of over 4,000 functions
- Over 1 million bytes of commented source text on-line
- IEEE floating point
- Extended precision integers, up to 65,000 digits

For Additional Information Contact Marketing Manager:

Headquarters:

Xerox Electro-Optical Systems
300 North Halstead Street
Pasadena, CA 91107
Phone (213) 351-2351
Telex: 67-5417

Washington, D.C., Operations:

Xerox Electro-Optical Systems
1616 North Ft. Myer Dr., 16th floor
Arlington, VA 22209
Phone (703) 841-0770

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The Smalltalk-80™ System:

1. What is Smalltalk?

Smalltalk is a programming environment in which the fundamental processing paradigm is to *send a message to an object* rather than the more traditional approach of *calling a procedure to operate on some data.* This approach—object-oriented programming—qualitiatively enhances the design, creation and maintainability of software systems. A great deal of this added power derives from *modularity.*

Incorporation of modularity, probably the best technique currently available for managing the complexity found in software systems, means that certain types of complexity are strictly contained within boundaries called *module interfaces.* Many programming systems have included features to promote and support modularity, but only above the level of the procedure call. In fact, representations of module interfaces have typically been a set of procedures. By contrast, the object/message approach incorporates modularity at the most basic level of software systems.

2. What is the advantage of the object-oriented approach?

Let us make our point with an example. In an object-oriented restaurant, you order food by sending the cook a message. The cook is assumed to have the requisite knowledge to take it from there, though you certainly may supply the cook with an explicit recipe. In a procedure-oriented restaurant, you *must* send the recipe to the cook. This means that you must know something about cooking and may even need to know something about the cook.

Procedure specification in the procedure call establishment constrains the cook as well. Suppose that, unbeknownst to you, the cook went back to school and learned a better way to prepare the food you are ordering. Only in the object-oriented restaurant could the new skills of the cook be exploited.

3. What are the advantages of the Smalltalk-80™ system over other languages?

First of all, the **Smalltalk-80** system is not just a language, but rather an *integrated programming environment.* What does that mean? It means that the system combines a compiler, decompiler, debugger, basic text editor, support for viewing information, and a user interface in a way that allows a programmer to move fluidly between writing code, debugging, and inspecting all levels of system operation in an integrated and modeless environment *during actual run time.* This fluidity helps the programmer maintain working context. Also, the system's support for inheritance of object class behavior has spawned a new, efficient programming style, *programming by modification*, which substantially reduces programming time. These attributes, made possible by the structural consistency of the environment (everything is an object), increase productivity.

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Ease of use and greater programming leverage are no accident. The **Smalltalk-80** system was used in pioneering research into user interfaces. The congruity and transparency of the environment across all levels of conceptual hierarchy complements the style of human cognition. The windowed display and mouse-driven cursor, now widely available in various other systems, were also created as an outgrowth of this basic research by the developers of the **Smalltalk-80** system.

4. What is the structure of the **Smalltalk-80** system?

The **Smalltalk-80** system has been designed for portability. The 600Kbyte Virtual Image is not hardware specific. It is written entirely in the **Smalltalk-80** language and is composed of almost 15,000 objects—the kernel classes, including basic data structures such as numbers and collections, and numerous tools as mentioned above.

The Virtual Image runs on a Virtual Machine which manages storage and enables the host hardware to emulate the **Smalltalk-80** instruction set. The Virtual Machine, typically about 30Kbytes, may be written in microcode, assembly language, a high-level language, or some combination of these.

5. How may the **Smalltalk-80** system be acquired?

To run the **Smalltalk-80** system you must have a Virtual Image, adequate hardware, and a Virtual Machine which will allow the image to run on the hardware. These may be acquired separately or as a complete package.

You may acquire the Virtual Image on magnetic tape directly from the Xerox Corporation. It can be run once you have acquired or implemented an adequate Virtual Machine.

You may implement a Virtual Machine yourself, following the specifications in *Smalltalk-80: The Language and its Implementation* ("The Blue Book"), or you may acquire one developed by another licensee. Implementations seem to require about one person year, though non-optimized versions can be done in a few months. *Smalltalk-80: Bits of History, Words of Advice*, ("The Green Book") includes reports and commentary on a number of implementation projects. A **Smalltalk-80** Newsletter has been created to serve as a forum for implementor dialogue and announcement of availability of new Virtual Machines.

You may also purchase the whole configuration—Virtual Image, Virtual Machine, and hardware—as a package. Information on such packages is available through individual vendor advertisement.

6. What hardware is required to run the **Smalltalk-80** system?

The user interface must include a keyboard, a pointing device like a mouse, and a bit-mapped display, preferably high resolution. The main memory must, of course, be able to hold the Virtual Image: 600Kbyte, less with virtual memory. Though the current licensed version of the **Smalltalk-80** system does not include a virtual memory, satisfactory operation of both the experimental LOOM (Large Object Oriented Memory) and paging schemes have been demonstrated and will probably be available on some implementations.

Beyond these absolutely minimal requirements, size and speed specifications depend upon user desires and task demands. Working in the **Smalltalk-80** environment tends to enlarge the system, so it is difficult to define a minimum desirable memory size, but 1Mbyte may be used as a rough lower bound. To some extent the "feel" of the user interface depends upon processor speed. While useful benchmarks are difficult to state in generic terms, efficient implementations on processors of at least the power of the Motorola 680XX, National Semiconductor 160XX, or the Intel 808X can be made to meet with general user approval.

7. Isn't it a contradiction in terms for a system designed as a *personal* computing medium to require such expensive hardware?

When we began developing the **Smalltalk-80** system in 1970, performance at today's level would have required hardware filling a small kitchen and costing as much as a house costs now in Silicon Valley. Today, the hardware fits under the kitchen sink and costs less than the house used to cost in 1970. We think it is probable that a **Smalltalk-80** system will be commercially available within the next two years in the $10K market. We will not be surprised if it happens in 1984. In other words cost is a function of time.

8. What does a **Smalltalk-80** license cost?

There are two different licenses: non-commercial and commercial. Licenses are machine and instruction set specific: implementations by the same licensee on two different computer models would require two separate licenses.

A non-commercial license, which allows internal use of the **Smalltalk-80** system by universities and not-for-profit research organizations, costs $400. We are essentially giving our research results to other research institutions in order to encourage use and dialogue.

The commercial license costs $20,000. It entitles the licensee to run the **Smalltalk-80** system on as many as 100 individual machines of the same computer model for internal use, and to sell machines running the system.

For each such machine sold by the licensee, a royalty of $150 must be paid to the Xerox Corporation.

A trail basis commercial license is also available. A license with this Limited License Option Rider costs $5,000, has a term of four months, is limited to 10, rather than 100 machines, and allows internal use only. It may be renewed or upgraded to a full commercial license within the four month period.

You may review the precise terms of the license by requesting a sample copy from:

Manager of Licensing
Xerox Corporation
P.O. Box 1600
Stamford CT 06904

9. What licensing arrangement will I need to sell **Smalltalk-80** applications software which I develop?

There are no license restrictions on the sale of applications which you develop for your customers and deliver as source code rather than as extensions or modifications embedded in a **Smalltalk-80** system.

On the other hand, applications which you deliver as part of a **Smalltalk-80** system may be transferred only to licensees or sub-licensees. Licensees are those who acquire a license directly from the Xerox Corporation. Sub-licensees are those who purchase licensed hardware from a licensee.

10. What applications programs are available now?

The licensed Virtual Image does not contain applications beyond program development tools. However, the licensed system *does* contain basic text and graphic editors, menus and other user interface components, and file support, all of which facilitate quick construction of system extensions. Researchers at Xerox PARC, software engineers at Xerox Special Information Systems, and customers who have purchased the **Smalltalk-80** system on the Xerox 1100 computer have developed electronic mail, calendar, document preparation, microprocessor development tools, map handling, image processing, and other applications as needed.

11. What support will Xerox provide for the **Smalltalk-80** system?

The Xerox Corporation hopes to give the **Smalltalk-80** system adequate support. This includes augmenting the documentation already provided in our books, and standing by to answer technical questions. We have recently

hired staff to publish the **Smalltalk-80** Newsletter and to respond to questions concerning licensing and use of the system.

The system is a research result rather than a fully supported product. As demand for the system develops, it is likely that greater support will become more available.

12. How can I get more information on the **Smalltalk-80** system?

o **Books**: The first three books listed below are available in bookstores now. If they are not available in your area you may order them directly from Addison Wesley Publishing Company: (617) 944-8660. The fourth book will be published later.

> *Smalltalk-80: The Language and its Implementation*, Goldberg and Robson—a description of the language and a formal specification for the Virtual Machine.
>
> *Smalltalk-80: Bits of History, Words of Advice*, Krasner, ed.—notes on Virtual Machine implementations.
>
> *Smalltalk-80: The Interactive Programming Environment*, Goldberg—a description of the user interface.
>
> *Smalltalk-80: Creating a User Interface and Graphical Applications.*

o **Articles**: A collection of articles on the **Smalltalk-80**™ system appeared in the August 1981 issue of *Byte* magazine.

o **Videotaped Demonstration**: A forty minute videotape of a **Smalltalk-80** demonstration is available through Xerox Corporation at the address below for $125 including shipping charges($150 outside USA).

o **Smalltalk-80 Newsletter**: You may ask to be added to our newsletter mailing list.

o **Network based interest groups**: If you have access to the UNIX™ UseNet you may listen in on the chat in the newsgroup net.lang.st80.

o **Direct inquiry**: Specific questions beyond the scope of the information contained in our books, or related to licensing may be directed to:

> Xerox Palo Alto Research Center
> 3333 Coyote Hill Road
> Palo Alto, California 94304
> Attention: Duane Bay

Xerox Corporation
P.O. Box 1600
Stamford, Connecticut 06904
203-329-8700

Office of General Counsel

XEROX August , 1983

Mr.

Re: Xerox Smalltalk-80™ System Commercial License

Dear Mr. :

This letter is in response to your expression of interest in the above captioned subject.

Enclosed are execution duplicates of the subject License Agreement which initially provides a paid-up license for up to 100 units of a computer model for internal R&D and business purposes for a charge of $20,000 as per 4.1. For payments due for additional uses, see 4.2-4.4.

If the firm which you represent desires to become a licensee, please fill in the LICENSEE's Name and Address in the preamble, list the COMPUTER MODEL(s) at 1.1, fill in the "to the attention of" portion of 10.1, and have an authorized person sign on behalf of the LICENSEE. Send both LICENSEE executed duplicates to me for execution by Xerox along with the firm's check for $20,000 per COMPUTER MODEL listed at 1.1. If finally acceptable to Xerox, I will then send one completely executed agreement to you for your files and have the Xerox Smalltalk-80 System Information department send you the licensed materials, i.e., one magnetic tape including:

(a) a copy of the VIRTUAL IMAGE object code;
(b) three traces from running the system simulator to allow licensee to verify successful virtual machine operation;
(c) one file of the system source code;
(d) one file containing the system changes (empty except for a copyright notice as the leader);
(e) one file containing a list of the class object pointers;
(f) one file containing the method object pointers;
(g) documentation describing the tape format; and
(h) nine files containing small examples of system applications.

XEROX

Please direct licensing questions to me. All technical comments or questions should be directed to

Adele Goldberg
Smalltalk-80 System Information
Xerox Palo Alto Research Center
3333 Coyote Hill Road
Palo Alto, California 94304

Very truly yours,

David C. Petre
Senior Counsel, Licensing

DCP/jcf
Enclosures

SMALLTALK-80™ SYSTEM LICENSE AGREEMENT

Xerox Corporation, a New York corporation ("XEROX") having a principal place of business in Stamford, Connecticut and

Name:_____

Address:_____

City, State, ZIP:_____

("LICENSEE") are the parties to this Agreement dated and effective _____ _____, 1983. The parties agree as follows:

ARTICLE 1. RECITAL

1.1 This Agreement is for LICENSEE's COMPUTER MODEL(S):

_____

_____

_____

_____.

(List each COMPUTER MODEL by name, type or number for which a license is desired.)

ARTICLE 2. DEFINITIONS

2.1 COMPUTER MODEL(S) means one or more computers or systems listed at 1.1 and being designed, developed, procured, loaned or leased by LICENSEE or one of its SUBSIDIARIES which is/are adapted to have a virtual machine that will operably accept the VIRTUAL IMAGE.

2.2 VIRTUAL IMAGE means the Smalltalk-80™ System support definitions and programming environment designed and developed by XEROX for employment with or operable or capable of being made operative on LICENSEE's COMPUTER MODEL(S). Reference in this Agreement to the term "VIRTUAL IMAGE" means all or any portion of the VIRTUAL IMAGE including any LICENSEE or its SUBSIDIARIES developed works based upon and evolved therefrom (hereinafter "derivative works") but does not include software applications independent of the Smalltalk-80™ System support definitions and programming environment.

2.3 SUBSIDIARY means a company the majority of whose stock entitled to vote for election of directors is now or hereafter controlled by the parent company either directly or indirectly, but any such company shall be deemed to be a SUBSIDIARY only so long as such control exisits.

ARTICLE 3. GRANT

3.1 Subject to Article 4 and all other terms and conditions of this Agreement, XEROX grants to LICENSEE, for itself and its SUBSIDIARIES a nonexclusive, nontransferable, worldwide, personal license to use, reproduce or to prepare derivative works of the VIRTUAL IMAGE only for incorporation and use in the COMPUTER MODEL(S) of LICENSEE and only for either or both of the following uses:

(a) for its own or its SUBSIDIARIES internal business purposes; or

(b) for written sublicense to and use by end users with units of such COMPUTER MODELS marketed by LICENSEE or its SUBSIDIARIES provided however, that in any event, this 3.1(b) right to sublicense shall not become effective prior to January 1, 1984.

3.2 Title to and ownership of the VIRTUAL IMAGE remains with XEROX.

3.3 Each sublicense of 3.1(b) shall:

(a) be a nonexclusive and nontransferable grant to and nonlicensable by the

end user (except pursuant to 3.3(c)) to use the VIRTUAL IMAGE on a single unit of a 3.1(b) COMPUTER MODEL marketed by LICENSEE or its SUBSIDIARY;

(b) subject the sublicensee to obligations to LICENSEE or its SUBSIDIARIES no less protective of XEROX rights in the VIRTUAL IMAGE than LICENSEES' and its SUBSIDIARES' obligations to XEROX under Articles 5. and 6. and Sections 8.1, 11.2, and 11.9-11.11;

(c) provide for (i) the end user to sell or lease the entire COMPUTER MODEL unit plus VIRTUAL IMAGE to a new end user which shall be subject to all 3.3 sublicensee obligations, or (ii) the end user to sell or lease the COMPUTER MODEL unit to a new end user and return the VIRTUAL IMAGE to the LICENSEE or its SUBSIDIARY which shall newly license the new end user for similar or updated software; and

(d) include an agreement and acknowledgment by the sublicensee for the third party benefit of XEROX, that sublicensee receives no warranty of any kind from XEROX.

ARTICLE 4. FEES AND PAYMENTS

4.1 LICENSEE shall promptly pay XEROX, upon complete execution of this Agreement, a nonrefundable license fee of twenty thousand dollars ($20,000) for each COMPUTER MODEL listed at 1.1. Upon LICENSEE receipt of the VIRTUAL IMAGE from XEROX pursuant to 7.1, the license of 3.1(a) shall become effective and paid up only for up to one hundred (100) units of each of the COMPUTER MODEL(S).

4.2 An additional, nonrefundable prepayment of fifteen thousand dollars ($15,000) shall become immediately due and payable by LICENSEE to XEROX as soon as the total number of 3.1(a) units of any COMPUTER MODEL exceeds one hundred (100). Payment thereof shall cause the 3.1(a) license for said COMPUTER MODEL to become effective and paid up for up to one hundred (100) additional units for a total of two hundred (200) units of said COMPUTER MODEL.

4.3 Separate and distinct from, and in addition to any 4.2 payments, the right to sublicense of 3.1(b) shall become effective only after January 1, 1984 and then only for a COMPUTER MODEL for which LICENSEE has made a twenty thousand dollar ($20,000) 4.1 payment, and then further only for up to one hundred (100) units of such a COMPUTER MODEL upon LICENSEE prepayment of a nonrefundable sum of fifteen thousand dollars ($15,000), which sum shall be paid by LICENSEE to XEROX prior to the first 3.1(b) sublicense becoming effective.

4.4 For 4.2 and 4.3 respectively, successive one hundred (100) unit blocs of such a COMPUTER MODEL shall become similarly licensed upon successive LICENSEE prepayment of additional fifteen thousand dollar ($15,000) sums.

ARTICLE 5. TERMINATION

5.1 In the event of any default of LICENSEE or one of its SUBSIDIARIES under this Agreement, or if any assignment shall be made for the benefit of creditors, or if a receiver or trustee in bankruptcy shall be appointed to take charge of all or part of LICENSEE's or one of its SUBSIDIARIES' property, XEROX may, at its election and in addition to any other remedies that it may have, at any time terminate all rights granted by XEROX under this Agreement by giving LICENSEE (i) in the case of default, thirty (30) days prior written notice specifying each such default, unless within the period of such notice all such defaults have been cured or remedied in compliance with this Agreement and (ii) in the case of assignment or appointment, immediate written notice of termination.

5.2 (a) Subject to 5.2(b), the following conditions apply upon termination: (i) LICENSEE and its SUBSIDIARIES shall discontinue use of the VIRTUAL IMAGE and shall either deliver to XEROX or destroy all VIRTUAL IMAGE and related materials furnished by XEROX, together with all copies thereof; (ii) LICENSEE and its SUBSIDIARIES shall erase or destroy any of the VIRTUAL IMAGE contained in computer memory or data storage apparatus under the control of LICENSEE or its SUBSIDIARIES; (iii) LICENSEE and its SUBSIDIARIES shall remove the VIRTUAL

IMAGE from any modification or merged work; and (iv) LICENSEE shall warrant in writing to XEROX within thirty (30) days of termination that the VIRTUAL IMAGE, related materials and all copies thereof have been either returned to XEROX or destroyed and erased or destroyed from computer memory or data storage apparatus.

(b) Post termination, LICENSEE and its SUBSIDIARIES may retain and use one copy of the VIRTUAL IMAGE only to the extent necessary to fulfill any customary maintenance and support obligations in its 3.1(b) sublicenses in effect prior to termination.

5.3 The rights and obligations of the following Articles and Sections shall survive any termination or expiration of this Agreement: Section 3.1(b) sublicenses in effect prior to termination; Articles 4., 5. and 6.; Section 9.1; and Article 11.

ARTICLE 6. USE, DISCLOSURE AND COPYING RESTRICTIONS, REPRODUCTION LABELING

6.1 LICENSEE and its SUBSIDIARIES shall not provide, disclose or otherwise make available the VIRTUAL IMAGE in any form whatsoever to any third party outside its/their organization(s), and shall not use the VIRTUAL IMAGE except pursuant to rights expressly granted by this Agreement, and shall circulate and disclose the VIRTUAL IMAGE within its/their organization(s) only to the extent necessary for the licensed use or uses of Article 3. LICENSEE and its SUBSIDIARIES shall inform each member of its/their organization(s) to whom the VIRTUAL IMAGE is circulated or disclosed that such circulation or disclosure is made subject to the use and disclosure obligations and restrictions of this Agreement. The obligations of this 6.1 shall terminate with respect to any particular portion of the VIRTUAL IMAGE if such portion is or becomes part of the public domain through no fault of LICENSEE or its SUBSIDIARIES or any member of its/their organization(s), is developed by LICENSEE independently of and without reference to the VIRTUAL IMAGE, or becomes known to LICENSEE free of any obligation of confidence.

6.2 LICENSEE and its SUBSIDIARIES may copy the VIRTUAL IMAGE, in whole or in part, only as necessary for backup or archival purposes or for the purpose of preparing

a derivative work. Each complete or partial copy or derivative work, whether in machine or human readable form, shall include in readable format any and all confidential, proprietary and copyright notices or markings contained on the original provided by XEROX.

6.3 LICENSEE shall not knowingly permit anyone, within its legitimate control, to use the VIRTUAL IMAGE, including portions thereof, for purposes other than as specifically authorized in this Agreement.

ARTICLE 7. SUPPORT AND MAINTENANCE RESPONSIBLITY

7.1 Upon receipt by XEROX of the 4.1 fee(s), XEROX shall furnish to LICENSEE the VIRTUAL IMAGE.

7.2 LICENSEE is solely responsible for the support and maintenance of the VIRTUAL IMAGE as incorporated into any COMPUTER MODEL(S) of LICENSEE or its SUBSIDIARIES or distributed by LICENSEE or its SUBSIDIARIES to an end user pursuant to 3.1(b).

7.3 LICENSEE acknowledges that XEROX is under no obligation to maintain or support the VIRTUAL IMAGE supplied to LICENSEE and that XEROX has no obligation to furnish LICENSEE or its SUBSIDIARIES with any further assistance, documentation or information of any nature or kind. XEROX may, in its sole discretion and without warranty supply to LICENSEE modifications or corrections made to the VIRTUAL IMAGE by XEROX.

ARTICLE 8. NOTIFICATION OF MISUSE

8.1 LICENSEE agrees that it will take reasonable steps to notify XEROX of any unauthorized reproduction, disclosure, distribution or use of the VIRTUAL IMAGE which may come to the attention of LICENSEE or its SUBSIDIARIES.

ARTICLE 9. NO WARRANTY

9.1 LICENSEE ACKNOWLEDGES FOR ITSELF AND ITS SUBSIDIARIES THAT THE VIRTUAL IMAGE IS SUPPLIED BY XEROX "AS IS" AND WITHOUT ANY WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE PERFORMANCE OR BEHAVIOR OF THE VIRTUAL IMAGE OR ITS EFFECT ON OR INTERACTIONS WITH A COMPUTER MODEL, THE OPERATION AND USE OF THE VIRTUAL IMAGE WILL BE UNINTERRUPTED OR ERROR FREE, ALL DEFECTS FOUND IN THE VIRTUAL IMAGE ARE CORRECTIVE, OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OR THAT USE OF THE VIRTUAL IMAGE WILL NOT INFRINGE ANY PATENT, COPYRIGHT OR TRADEMARK, AND IS NOT RESPONSIBLE FOR DAMAGES, INCLUDING, BUT NOT LIMITED TO, CONSEQUENTIAL AND INCIDENTAL DAMAGES OCCURRING OUT OF OR IN CONNECTION WITH THE USE, ADAPTATION, MODIFICATION OR PERFORMANCE OF THE VIRTUAL IMAGE EVEN IF XEROX HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

ARTICLE 10. NOTICES

10.1 Except as either party may later notify in writing with respect to itself, the addresses of the parties for all purposes of this Agreement, shall be for XEROX:

Manager of Licensing
Xerox Corporation
P. O. Box 1600
Stamford, Connecticut 06904

and LICENSEE the address first given above, to the attention of:

ARTICLE 11. MISCELLANEOUS PROVISIONS

11.1 This Agreement is effective from the date of execution by XEROX.

11.2 (a) This Agreement shall not be construed as conferring by implication or estoppel any license or right under any patent or trademark of XEROX, whether or not the exercise of any right under this Agreement may employ an invention of any existing or later issued patent.

(b) Subject to 11.2(c), LICENSEE agrees that neither LICENSEE nor its SUBSIDIARIES shall, without XEROX express written permission, (i) use in advertising, publicity, or otherwise any trade name, trademark, trade device, service mark, symbol or any other identification or any abbreviation, contraction or simulation thereof owned or used by XEROX, or (ii) represent, directly or indirectly, that any product or service of LICENSEE or its SUBSIDIARIES is a product or service of XEROX or is made in accordance with or utilizes any information or documentation of XEROX.

(c) To the extent necessary to exercise its 3.1(b) rights and then only for units of COMPUTER MODELS for which a 4.3 or 4.4 payment has been made, LICENSEE and its SUBSIDIARIES may identify to prospective sublicensees that it "is authorized by XEROX to sublicense the Smalltalk-80™ System".

(d) Any derivative work sublicensed under 3.1(b) shall be clearly identified as such by LICENSEE or its SUBSIDIARIES to prospective sublicensees.

11.3 This Agreement embodies the entire understanding between the parties. Terms and conditions contained in any LICENSEE purchase order or other ordering document submitted pursuant hereto shall have no binding effect on XEROX and will not modify this Agreement in any manner.

11.4 Subject to 3.1(b), neither this Agreement nor any rights granted under this Agreement shall be assignable or sublicensable or otherwise transferable by LICENSEE or its SUBSIDIARES, in whole or in part.

11.5 No amendment or modification or addition of this Agreement shall be effective or binding on either of the parties unless the same has been reduced to writing and signed by authorized representatives of both parties.

11.6 No delay or failure of XEROX to exercise any right or remedy will operate as a waiver thereof. No waiver of any of the provisions of this Agreement for a particular situation shall be deemed or constitute a permanent waiver of such provision for any other situation that may arise thereunder nor shall waiver constitute a continuing waiver for the same situation if it should reoccur.

11.7 Every right or remedy herein conferred upon or reserved to XEROX is not exclusive but accumulative of any other right or remedy herein or provided or permitted by law or equity to XEROX.

11.8 The construction and performance of this Agreement shall be governed by the law of the State of New York.

11.9 At XEROX' request, but not more frequently than annually, LICENSEE shall (i) furnish to XEROX a statement, certified by an authorized representative of LICENSEE, that the use of the VIRTUAL IMAGE by LICENSEE and its SUBSIDIARIES has been reviewed and that the VIRTUAL IMAGE is being used solely pursuant to the provisions of this Agreement; and (ii) furnish a similar statement that its/their 3.1(b) sublicensees have furnished to LICENSEE or its SUBSIDIARIES a similar statement.

11.10 Notwithstanding any other provision of this Agreement, LICENSEE agrees that it and its SUBSIDIARIES will not export, directly or indirectly, the VIRTUAL IMAGE or any U.S. source technical data acquired from XEROX, or any products using the VIRTUAL IMAGE or any such data, to Afghanistan, Albania, Bulgaria, Cambodia, Cuba, Czechoslavakia, Estonia, German Democratic Republic (including East Berlin), Hungary, Kampuchea, Laos, Latvia, Libya, Lithuania, Mongolian People's Republic, North Korea, People's Republic of China, Poland, Romania, Union of Soviet Socialist Republics, Vietnam and to any other country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining the written consent to do so from the U.S. Department of Commerce or other agency of the United States Government when required by an applicable statute or regulation.

11.11 LICENSEE and its SUBSIDIARIES shall keep records adequate to verify Article 4. fees and payments to be made pursuant to this Agreement for three (3) full years

following the submission of each such fee or payment to XEROX. LICENSEE and its SUBSIDIARIES and their 3.1(b) sublicensees shall also permit their books and records to be examined once during any calendar year on reasonable notice during regular business hours by a mutually acceptable independent auditor paid by XEROX. Such independent auditor shall not disclose to XEROX any information other than that relating solely to the correctness of, or the necessity for, the fees and payments to be made pursuant to this Agreement.

IN WITNESS WHEREOF, each of the parties has caused this Agreement to be executed in duplicate originals by its duly authorized representatives on the respective dates entered below.

LICENSEE	XEROX CORPORATION
By_____	By_____
Name (print):_____	Name (print):_____
Title:_____	Title:_____
Date:_____	Date:_____

XEROX

May ,1984

Mr.

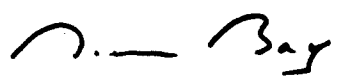
Dear Mr. ,

A few months ago you asked for information about licensing the Smalltalk-80™ system. I hope you received a copy of the contract. I'm writing to announce a new licensing arrangement which may be of interest to you.

In response to several requests, we have developed a "trail basis" licensing arrangement. This Limited License Option Rider allows internal use of the Smalltalk-80 Virtual Image for a four month period at a reduced fee of $5000. It may be renewed or upgraded to a full commercial license within the contract period. I would be happy to send a copy of the rider for your review.

The number of Smalltalk-80 licensees is growing steadily. If you are still considering joining the more than fifty current licensees, please do not hesitate to contact me about any questions or concerns you may have. We continue to be excited about getting the Smalltalk-80 system out into the world. Thank you for your interest.

Sincerely,



Duane Bay
License Communications
System Concepts Laboratory

Smalltalk operating system makes loud noise quickly

Although still in development, the Smalltalk operating system and language appear to be gaining strong support from potential users. The foursome lining up at Xerox Inc. (Stamford, Conn.) to take out licenses—Digital Equipment Corp., Hewlett-Packard Co., Apple Computer, Inc., and Tektronix Inc.—makes it clear that major computer companies see potential in the system.

William Kemper, in charge of software development tools at Hewlett-Packard (Corvallis, Ore.) says that Smalltalk's graphics features are like having a VisiCalc program with more than one worksheet. In a Smalltalk environment, if, say, a user working on worksheet C changes a variable also located on worksheet A, the variable on A will be automatically changed to reflect its new state. Moreover, all three worksheets can be active at once and the user can move from one to the other at will.

According to Edward Cherlin, director of personal computer research at Strategic Inc. (San Jose, Calif.), Smalltalk will be technically superior to other operating systems. He says that Smalltalk allows for better program structure and ease of programming, and also offers greater program security.

However, Cherlin questions just how Xerox will take advantage of Smalltalk. He says that other companies like Apple Computer could build a 16-bit 68000-based system with hard-disk storage for about $7000. A Xerox spokesman recently stated that the company has no plans for a product in this price range—which would be less than half the $16,595 of the Xerox Star.

New software brings C language to small systems

The C language, whose rapid growth has been linked to wider use of Unix and Unix-like operating systems, is gaining independent support. The C Executive, written by JMI Software Consultants Inc. (Trevose, Pa.) for LSI-11, MC68000, 8080/8085, and Z80 processors, is aimed at low-cost, high-volume systems that do not need a full operating system. Residing only in main memory, the C Executive runs multiple tasks concurrently and has an intertask communication capability—similar to a mailbox exchange—that is generally not provided by Unix Systems. JMI also says it will soon release a version of the Executive that will handle programs written in Pascal.

Cable TV modem promises more home data services

Low-cost interactive residential data communications through cable television systems is coming closer. Datavision Inc. (East Detroit, Mich.) has announced a PSK/OOK (phase-shift key/on-off key) cable TV modem costing less than $50 that may eventually make possible such interactive services as security monitoring, electronic mail, shopping, and banking.

Using one of 89 available channels, the modem operates at 5 to 14 MHz for incoming signals and 108 to 117 MHz for transmission. (The channel is selected by changing the crystals within the unit.)

Currently, Grosse Point (Mich.) Cable Co. is using the modem in a microcomputer-based control unit that monitors a cable TV subscriber's water meter. It then sells access to that information to the local water utility.

Digital Research expands language offerings

Software suppliers are moving out of the cottage-industry stage and beginning to broaden their product lines. Digital Research Inc. (Pacific Grove, Calif.), for example, has recently signed a nonexclusive agreement to market Cobol compilers written by Micro Focus Inc. (Santa Clara, Calif.) for 8080 or 8086 microprocessors. Though Micro Focus will continue for the time being to offer the compiler, for use with CP/M and MP/M operating systems, it will eventually hand over all sales and marketing of its CP/M-standard products to Digital Research.

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SOFTWARE

Following 10 Years Of Development, Xerox Offers Smalltalk For Licensing

By Michael Azzara

PALO ALTO, CALIF. — Smalltalk-80, the programming environment credited as the great granddaddy of the current crop of integrated operating environments, has been released for general licensing by Xerox Corp.

Apple Computer Inc.'s Lisa and VisiCorp's Visi^{ON}, both of which have taken leadership positions in the emerging market for integrated software environments, trace their origins back to Smalltalk, which has been under development for more than a decade at Xerox PARC (Palo Alto Research Center) here.

But a Xerox spokeswoman said both those products implement only a small portion of the complete Smalltalk environment, which is credited with pioneering development of sophisticated man/machine interfaces through the use of icons in conjunction with bit-mapped graphics displays and "mouse" cursor-positioning devices.

"People hear 'Smalltalk' and they think it's a kid's language," the spokeswoman said. "But it's not. It's an environment for exploratory development and programming—it's for programmers."

According to Daniel Ingalls, one of the scientists of Xerox's Software Concepts Group, which developed Smalltalk, Smalltalk is both a language and a software-development environment. "It's an entirely interactive system—a language complete with editors and other development tools all in a window-based framework with a graphics interface," Ingalls said.

Among Smalltalk's key features for software developers are its ability to be modified on-line and the object-oriented metaphor on which it is based, according to Ingalls. He noted that such features, along with its powerful user interface, set Smalltalk apart from other programming environments such as Unix, Ada, and the UCSD p-System.

Source Code Window

"In Smalltalk, you can have a window open on source code and change the system while you're using it," Ingalls said. Other systems require recompiling and reloading before source code editing takes effect, "but our system can do all that within itself," he noted.

Xerox initially expects to license Smalltalk to universities and to software houses for commercial research and development, Ingalls said. For now, Smalltalk is of no use to most end users because there is only one machine-specific implementation of the package, on Xerox's 1100 scientific information processor, a $59,000 machine.

Ingalls said Xerox expects researchers in universities and third-party software houses to develop interpreters, which Xerox calls "virtual machines," for specific hardware, along with the development of applications to run with Smalltalk.

Xerox itself is offering for license a generic version of the Smalltalk "virtual image," the portion of Smalltalk that is machine-independent, Ingalls said. The licensing fee is $20,000 for commercial users and $400 for educational users. The company said it will allow resellers to sublicense Smalltalk for $150 beginning early next year.

Industry observers, however, doubt that the Smalltalk product itself will have a significant impact on the software market even though its influence has been so widespread.

"The original expectation had been that Xerox itself would attempt to popularize Smalltalk in conjunction with its workstations—the Star and others," said Kenneth G. Bosomworth, president of International Resource Development Inc. "But to put it mildly, the market hasn't gone Xerox's way.

"Xerox probably recognizes there's no chance Smalltalk could become a de facto standard or even a widely used product if it's restricted to Xerox products, so they may as well license it to everyone else too. But they probably feel they've been upstaged by Apple's Lisa and VisiCorp's Visi^{ON} and so forth.

"Smalltalk was made to provide the man/machine interface capabilities that these other systems are doing. I doubt it can become a significant language."

Jean Yates of Yates Ventures has a more optimistic outlook for Smalltalk. "The product is just unparalleled for its ability to develop multiple user windows," she said.

"Although it's not practical for micros [because the program is so large], it does run on them, and someone will come out with a commercial subset of Smalltalk that could very possibly end up becoming the language of choice for developing user interfaces."

Yates said there are at least eight start-up software companies developing products around Smalltalk, plus interest from more established companies like Microsoft Corp.

Additionally, sources have reported that IBM, Hewlett-Packard Co., and Digital Equipment Corp. are among the approximately half-dozen companies that licensed Smalltalk under nondisclosure agreements more than a year ago.