

# NEWS RELEASE

Contact: Mary Feeley  
Symbolics, Inc.  
(617) 621-7500

Jane Palmer or Joe Grillo  
Hill and Knowlton, Inc.  
Advanced Technology Division  
(617) 894-3100

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## SYMBOLICS ANNOUNCES THE MacIVORY FOR DELIVERING SYMBOLIC PROCESSING APPLICATIONS

ST. PAUL, Minn., August 22 — Symbolics, Inc. today introduced the MacIvory™, a low-end system for the delivery of symbolic processing applications. The MacIvory combines Symbolics' Ivory™ processor and Genera® symbolic processing environment with all the features of the Apple® Macintosh® II system.

Formally unveiled at the 7th annual American Association for Artificial Intelligence (AAAI) show, the MacIvory desktop system provides developers with a standard platform for delivering applications developed on Symbolics 3600™ workstations and the company's newly announced XL400 system. It also gives users access to the wide range of existing Macintosh applications and integrates easily with applications in commercial, industrial and military computing environments.

"The MacIvory is an important part of Symbolics' strategy to lower the cost of applications delivery and to provide symbolic processing on industry-standard platforms," said Jay Wurts, chief executive officer. "With MacIvory we can give many more users access to Symbolics' Genera, considered the richest and most comprehensive software environment in the industry."

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SYMBOLICS ANNOUNCES MacIVORY — 2/

Symbolic processing technology makes it easier to represent and solve complex problems. It allows programmers to work with symbols, relationships and graphical objects as well as traditional numbers, characters and bits. With this technology, problems can be modeled more closely to real-world situations.

The MacIvory consists of a Macintosh II and a Symbolics add-in board containing the Ivory high-performance symbolic processor and NuBus<sup>TM</sup> interface. It is the first system based on Symbolics' Ivory processor and the first time that Symbolics has made its advanced processor technology available on non-proprietary platforms.

"Our Ivory VLSI technology puts a complete symbolic processor on a single chip, so we are able to increase the performance and lower the cost of the processor," said Rich Krueger, product marketing manager. "This will make symbolic processing more affordable for end users and broaden the market for sophisticated applications."

The MacIvory supports applications written in Symbolics Common Lisp<sup>®</sup>, Symbolics C<sup>TM</sup>, Symbolics FORTRAN<sup>TM</sup>, and Symbolics Pascal<sup>TM</sup>. It also supports the following Symbolics layered software products:

- Joshua<sup>TM</sup> for building and delivering expert system applications.
- Concordia<sup>TM</sup> for creating, revising, maintaining and delivering complex documentation projects.
- Statice<sup>TM</sup>, the first commercially available object-oriented database.
- S-DYNAMICS<sup>®</sup> and S-GEOMETRY<sup>®</sup> for 2-D and 3-D animation.
- CLOE<sup>TM</sup> for delivering CLOE-based applications.

As part of the Apple value-added reseller agreement — also announced at AAAI — Symbolics will provide service and support for the MacIvory hardware and software.

## SYMBOLICS ANNOUNCES MacIVORY -- 3/

The standard MacIvory configuration for application delivery includes Genera delivery software, the Symbolics add-in board, the Macintosh II with one megabyte of NuBus memory, the Apple mouse and extended keyboard, a 12-inch monochrome console, and a 300-megabyte (formatted) SCSI disk drive.

A wide range of hardware and software options also are available including tailored upgrade packages for users with installed Macintosh systems.

Pricing for the MacIvory system starts at \$21,900 (U.S. prices), with limited shipments in early October and volume shipments scheduled for late December.

For users who just want the Symbolics board set and software, Symbolics will provide an upgrade package with the MacIvory board, eight megabytes of NuBus memory and Genera delivery software. Pricing for the board set starts at \$10,900 (U.S. prices) with availability in March 1989.

### VME-based Development System Announced

Symbolics also announced its next-generation Symbolics XL400<sup>TM</sup> workstation, a high-end, high-performance development system that also includes the Ivory processor. The XL400 is based on the industry-standard VMEbus, giving users access to VME-based peripherals. Its software is fully compatible with the Symbolics 3600 series of workstations.

The XL400 consists of Genera development software, an Ivory processor board with two megawords of memory, an I/O board with ESDI, SCSI and Ethernet<sup>®</sup> interfaces, an ESDI 380-megabyte (unformatted) disk drive, and a 19-inch monochrome console. It has seven VME slots with five available for optional industry-standard peripherals.

Pricing begins at \$64,900 (U.S. prices) with availability scheduled for March 1989.

SYMBOLICS ANNOUNCES MacIVORY -- 4/

Symbolics, Inc., headquartered in Cambridge, Mass., with operations in Chatsworth, Calif., is the leading manufacturer and marketer of Symbolic processing systems for developing and running complex, strategic applications. The company's stock is traded over the NASDAQ system (SMBX).

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NuBus is a trademark of Texas Instruments, Inc.

Ethernet is a registered trademark of Xerox Corporation.

# BACKGROUND

## HOW DOES SYMBOLICS' IVORY COMPARE WITH TI'S EXPLORER MEGACHIP?

	<u>IVORY</u>	<u>MEGACHIP</u>	<u>BENEFITS</u>
<u>Single-Chip CPU</u>	YES	NO	Ivory is the industry's only single-chip Lisp processor. TI's chip requires additional microcode RAM + cache + garbage collection circuitry.
<u>Word Length</u>	40 bits	32 bits	Only Ivory has full 8-bit tag field and a full 32-bit address/data field.
<u>Address</u>	32 bits	25 bits	Ivory has 128 times the address space of MegaChip.
<u>Integer Length</u>	32 bits	25 bits	Ivory's standard integer length means compatibility with 32-bit PCs and workstations.
<u>Floating Point</u>	32 bit IEEE standard types; fast co-processor interface	non-standard immediate data types	Aided by a commodity floating point co-processor, Ivory has state-of-the-art floating point performance.
<u>On-Chip Parallel Tag Processing</u>	8 bits	7 bits	Ivory supports an 8-bit tag field for such features as generic functions, garbage collection and advanced debugging.
<u>On-Chip Error Checking and Correction</u>	YES	NO	With 8-bit ECC, Ivory can be configured more cheaply, reliably and with higher performance.
<u>On-Chip Call/Return</u>	YES	NO	Extremely fast Lisp execution; full Common Lisp function calling supported on Ivory chip

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HOW DOES IVORY COMPARE? -- 2/

<u>On-Chip Message Dispatch</u>	YES	NO	Fast implementation of object-oriented software (New Flavors)
<u>On-Chip Vector Instructions</u>	YES	NO	High-speed vector operations such as database searching, graphics, garbage collection
<u>On-Chip Stack Cache</u>	YES	YES	On-chip cache gives fast local stack access.
<u>On-Chip Instruction Cache</u>	YES	NO	Maintains high execution rate.
<u>Prefetcher</u>	YES	YES	Improves execution rate.
<u>On-Chip Interleaved Memory Interface</u>	YES	NO	Ivory can operate at full speed with standard memories. No external cache is needed to achieve full performance.
<u>On-Chip Garbage Collection Support</u>	YES	YES	Ivory has no hardware overhead for full ephemeral and incremental garbage collection
<u>On-Chip Virtual Memory Management</u>	YES	NO	Integrated map cache, cache refill logic and microcode implements full virtual memory management on Ivory chip.
<u>Single Cycle Simple OPs</u>	YES	YES	Fast operation
<u>On-Chip Microcode</u>	YES	NO	Ivory's compact instruction set needs no external microcode ROM.