MICROWARE™

PRODUCT BENEFITS

Rapid Application Development (RAD)
OS-9 accelerates your total project time by enabling parallel hardware and software development.

Unbeatable Security
The process-based architecture localizes failures so they cannot affect other processes or system resources.

Adaptable End Products
Modules in deployed systems can be upgraded or fixed without a re-boot while the system is on line and in use.
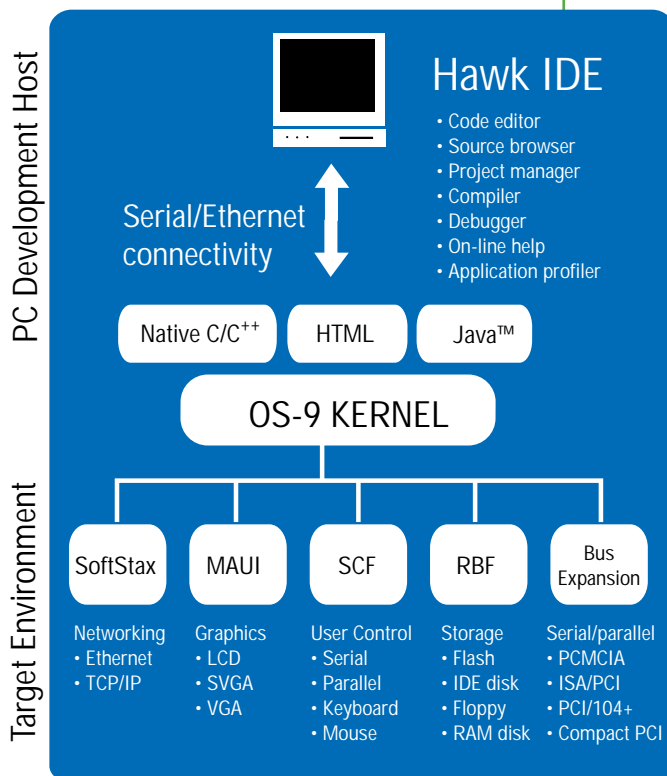
Product Development Expertise
Customer care engineers respond quickly and intelligently to technical questions, and consultants provide advisory expertise, project management, and development services.

Comprehensive Hardware Support
Runs right out of the box on all industry standard PC compatible hardware with a 80386 class processor (protected-mode) or higher. The embedded systems package is required to port OS-9 to target hardware when BIOS support is not available. No porting effort is required when BIOSs such as AMI or Award are used. PC-AT, PC-ATX, and embedded board designs are all supported. Support for AT, PCI, PC104, and PC104+ busses are included.

PRODUCT OVERVIEW

Microware's Enhanced OS-9 for X86 is an integrated system software and development tool package designed specifically for today's X86 and Pentium class processors. These products easily install under Windows 95/98/NT to facilitate the creation, download and execution of real-time application software running OS-9.

OS-9 for Embedded Systems
OS-9 for X86 is a licensed product that includes a development environment, run-time binary software image, and driver sources for custom X86 and Pentium hardware platform development.

OS-9 Board Level Solution
The X86 Board Level Solution (BLS) provides a complete OS-9 run-time and development environment for immediate application development targeting X86 and Pentium platforms.

PersonalJava™ Technology
Microware offers and enhanced and optimized implementation of Sun's PersonalJava™ environment enabling a world of Java™ programs and programmers to immediately target your Java-enabled device.

HawkEye Visualization Tool
HawkEye is Microware's real-time visualization tool designed for debugging and performance tuning. It captures all the events that pass through the OS-9 kernel and displays them on a timeline. Many bugs are easily attacked with a conventional debugger, but some are timing dependent or involve interactions between multiple processes. HawkEye collects information from a system running at nearly full speed so it can capture the events surrounding a timing-dependent bug.

Not only does HawkEye capture events relating to the processes and interrupt service routines in the system, it also breaks them out by process and explicitly draws interactions such as signals and locks. This graphical presentation helps the user see the bugs immediately.

HawkEye complements the Hawk statistical profiler. Using the Pentium's high-resolution timing facility, HawkEye accurately positions events on a timeline. This makes it easy to see where the system is spending time. The Hawk profiler shows where time is spent over a long period, while HawkEye shows the details of performance over critical intervals.

OS-9 DIAGRAM

PC Development Host

Hawk IDE
- Code editor
- Source browser
- Project manager
- Compiler
- Debugger
- On-line help
- Application profiler

Serial/Ethernet connectivity

| Native C/C++ | HTML | Java™ |

OS-9 KERNEL

Target Environment

SoftStax	MAUI	SCF	RBF	Bus Expansion
Networking	Graphics	User Control	Storage	Serial/parallel
• Ethernet	• LCD	• Serial	• Flash	• PCMCIA
• TCP/IP	• SVGA	• Parallel	• IDE disk	• ISA/PCI
	• VGA	• Keyboard	• Floppy	• PCI/104+
		• Mouse	• RAM disk	• Compact PCI

PC-AT Support

Based on the technically superior OS-9 real-time operating system, Enhanced OS-9 for X86 provides a drop-in system software solution. OS-9 for X86 supports all popular PC-AT devices, to address the communications, connectivity, user interface, and storage requirements of communications, imaging, industrial control and similar intelligent systems.

Hawk Integrated Development Environment (IDE)

Enhanced OS-9 for X86 provides an open environment for resident and networked application development. Microware's Hawk provides robust productivity tools to create X86 system images for Flash, ROM or disk. Once your application is complete, Microware provides flexible licensing options allowing you to easily and affordably distribute to your market.

This combination of a proven OS-9 system software base, a robust development tool set and drop-in device support for PC-AT offers integrators and manufacturers the advantage of Rapid Application Development (RAD) for real-time systems.

PRODUCT FEATURES

OS-9 Kernel

The OS-9 kernel provides a secure, process-based, multi-tasking environment for embedded systems. OS-9's use of position-independent, reentrant code modules allow the kernel to dynamically load application and/or system modules at run time. This capability enables system designers to add, replace and implement software modules across the network during development or in the field.

SoftStax Communications Framework

Microware's SoftStax networking solution builds on the OS-9 I/O framework to provide a high-performance communications subsystem that supports a wide variety of standard and custom networking protocols. Applications written to SoftStax can run over any supported protocol and are network independent.

MAUI Embedded Multimedia Support

Microware's MAUI graphics solution provides a rich set of text, drawing and animation services with windowing, clipping, and inking services to support the graphical interface. The small and fast graphics subsystem takes advantage of the real-time design features of OS-9.

Serial/Parallel I/O

The Sequential Character File Manager (SCF) I/O subsystem handles basic character oriented I/O devices, such as serial ports, parallel ports and modems. It also functions as the input path for a variety of MAUI devices, such as keypads, mice and touchscreens.

Storage I/O

The Random Block File Manager (RBF) I/O subsystem implements a hierarchical, UNIX-like file system for data storage. Enhanced OS-9 for X86 includes a RAM disk device driver for OEMs whose devices require temporary storage during operation.

PCMCIA

Enhanced OS-9 for X86 features PCMCIA technologies to support a variety of popular PCMCIA devices including modems, ATA flash and hard disks, 8250 serial devices, Ethernet and more.

PC/104 and PC/104+

Microware provides complete access for reference hardware which supports PC/104 and PC/104+ interfaces, allowing users to expand board functionality with popular ISA and PCI based PC/104(+) devices.

Super I/O

Enhanced OS-9 for X86 supports the standard PC-AT compatible I/O, including floppy, IDE hard disks, keyboard, mouse, serial and parallel ports.

Hawk

Microware's Hawk IDE is designed to increase the efficiency of development under OS-9. Hawk's highly integrated tool set simplifies and automates the tasks of creating, debugging, analyzing and managing complex real-time software development projects.

OS-9 Configuration Wizard

The OS-9 configuration wizard provides a graphical user interface which simplifies the sometimes complex task of configuring and building system images. Simply point and click for networking, TCP/IP configuration, graphics, debugging, and the wizard automatically creates a software image for your target.

OS-9 for X86

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PRODUCT CONTENTS

Enhanced OS-9 for X86 contains the following software integrated on CD-ROM:

- OS-9 RTOS
- MAUI multimedia I/O system
- SoftStax communications framework
- BSD v4.4 TCP/UDP/IP LAN networking
- Sample application source code
- Finished ported boot image for reference platform(s)
- Device driver source (in licensed package only)
- OS-9 configuration wizard
- Microware Hawk IDE including:
    - Premia's Codewright™ code editor
    - Source code browser
    - Project manager
    - Ultra C/C++ Compiler
    - Hawk system-and-user-state debugger
    - Resident tool set
    - On-line help

SYSTEM REQUIREMENTS

Host Development System
- Microsoft Windows 95, 98 or NT
- Pentium processor
- 32 MB RAM
- 250-350 MB free disk space
- CD-ROM Drive
- Ethernet networking
  (optional, but recommended)

Target System
- Standard PC-AT system or compatible
- 386 or higher CPU
- At least two megabytes of system RAM
- Standard PC style 3.5 inch floppy
- VGA card and keyboard or 16550
  compatible serial port
- Ethernet networking
  (optional, but recommended)

The X86 release includes everything required to create OS-9 boot media using standard 3.5 inch floppies. For embedded system, the floppy device may be removed once the target system has been prepared.

HARDWARE DRIVERS

New drivers are continually being added to support the latest in networking, graphics, and disk technology. Here are a few supported devices:

Ethernet Controllers
- 3COM PCI EtherLink XL
- 3COM PCI EtherLink III
- 3COM ISA EtherLink III
- SMC Ultra 83C790
- SMC 8390
- 3COM EtherLink III PC CARD
- DEC 21140
- Am79C961A/Am 79C973
- NE2000

MAUI VGA Support
- Generic VGA mode 13
- Generic VGA mode 12 & "X"
- Cirrus Alpine Series - CL-GD5434, CL-GD5480 etc.
- Chips & Technology 65545 flat panel display
- S3 Virge
- ST Microelectronics STPC

Sequential Device Support
- VGA graphics/keyboard
- Serial mouse
- PS2 mouse
- 16550 serial
- Digiboard
- HostessI
- Risicom
- Parallel printer

Physical Disk Media
- IDE standard
- PCMCIA IDE
- PC-AT style floppy
- Symbios 810,810A,825,825A and 875 PCI SCSI controllers—Wide, Ultra and Ultra Wide supported
- Diamond FirePort20 and FirePort40—Wide, Ultra and Ultra Wide supported
- Adaptec 1540/1542 ISA
- Adaptec 2940, 2940U and 2940UW

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DOCUMENTATION

Extensive tutorial-style documentation is included on the product CD-ROM. The searchable documentation includes getting started manuals, using guides, programming references, and porting guides for all product components. For additional user convenience, help files can be accessed directly from the development tool.

PROFESSIONAL SERVICES

Microware's professional services team works individually with clients to customize the right set of services for each client's challenges. Microware's goal is to make each customer successful through premier advisory services and software engineering solutions. Microware's approach delivers complete solutions that are on time and on budget.

TRAINING & SUPPORT

Microware's #1 rated application support engineers quickly and effectively diagnose problems and answer customer questions. Microware's training seminars accelerate your development cycle by giving you hands-on experience with OS-9, guided by our experienced training engineers.

COMPANY DESCRIPTION

For more than 20 years, Microware (NASDAQ: MWAR) has developed, marketed, and supported real-time operating system software and development tools covering the spectrum from deeply embedded applications to high-end consumer devices.

ORDERING INFORMATION

For pricing, licensing, and ordering details, contact your local Microware representative or Microware headquarters at 1-800-475-9000 or 1-515-223-8000. Contact us by e-mail: info@microware.com

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