Getting Started with Microware Products

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Chapter 1: Installing and Starting Microware Products

This chapter describes how to get started using your Microware software and provides a brief overview of the OS-9 operating system and its components. It includes the following sections:

- **Installing Your Software**
- **Starting Your Project**
- **Enhanced OS-9 Runtime Software Components Overview**
- **Enhanced OS-9 Tools Overview**

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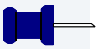
MICROWARE SOFTWARE

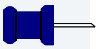
Installing Your Software

Begin the installation by placing the product CD into the CD ROM drive on the host PC. The Windows Autorun feature automatically starts the installer and opens the first installer window. Several options are presented at this point, including installing software, viewing documentation, or viewing the multi-media demonstration. Some of these options are described below.



Note

Menu selections, screen images, and exact procedures may vary slightly depending on your specific product.



Note

You can also start autorun by navigating to the Autorun folder on the CD ROM in Windows Explorer and selecting `autorun.exe`.

Running the Solutions Demo

The multi-media demo includes screen shots and streaming video in a high-level overview of the Microware product suite. No software installation is required to view the demo. The demo requires a sound card.

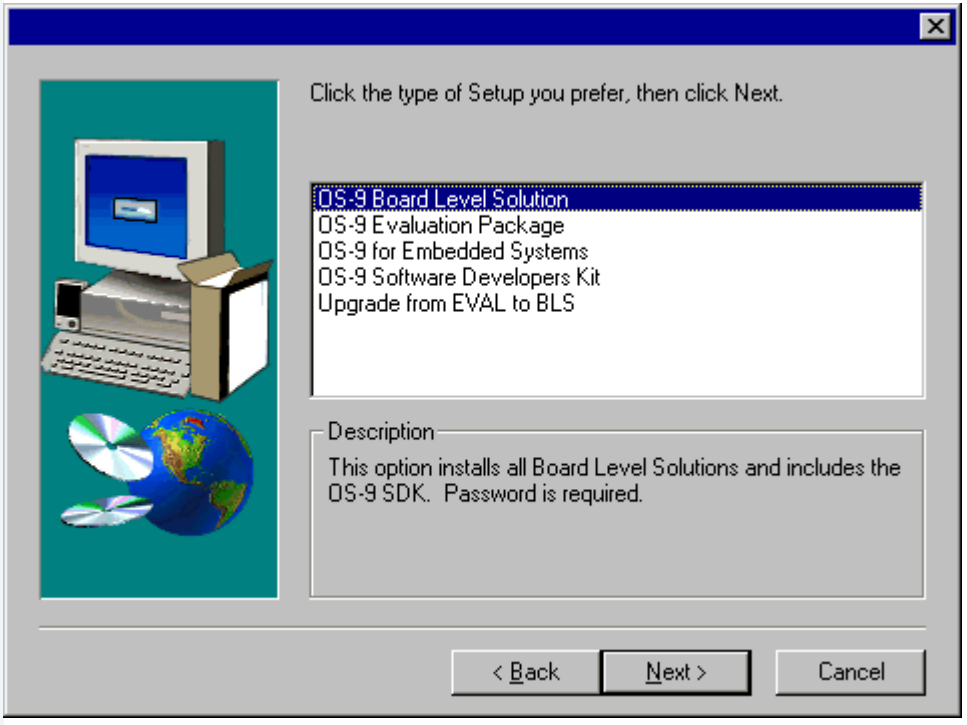
Installing the Microcode Solutions Library

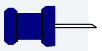
The IXP1200 Microcode Solutions Library installer is launched directly from the first installer window. Follow the instructions provided with the installer. It is recommended that you install the Intel Workbench software prior to installing the IXP1200 Microcode Solutions Library.

Installing OS-9

Selecting Enhanced OS-9 for <your product> in the first installer window starts the OS-9 installer. Selecting Install Enhanced OS-9 provides the installation options shown in **Figure 1-1**. Select the option appropriate to your purchase agreement. A description for each option is provided in the Description field of the window.

Figure 1-1 Installation Options



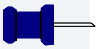


Note

The following example describes an **OS-9 for Embedded Systems** installation. The other installation options may vary slightly.

Step 1. Select OS-9 for Embedded Systems to install the OS-9 software.

Step 2. Enter your password. You must supply a password unless you are installing the Evaluation Package.



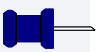
Note

Product passwords are case sensitive.

Passwords are provided on a card and shipped with your CD. If you are upgrading from an Evaluation package, you can place an order and your passwords can be faxed to you.

Step 3. Read the Microware License Agreement.

Step 4. Select the path and directory where OS-9 is to be installed.



Note

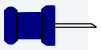
When selecting the directory in which to install Enhanced OS-9 on your host system, you can select any valid drive for the installation. However, it is recommended that you use the name MWOS for the root directory name.

Step 5. Set your file association preferences. This enables you to start the Hawk integrated development environment by double-clicking on files with specified extensions.

Step 6. Verify your installation configuration choices. At this point you can change your configuration or begin the install.

The installer automatically copies OS-9, the OS-9 components, and the development tools to your host system. Installation progress is shown on the screen.

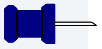
Step 7. Return to the Enhanced OS-9 window.



Note

The additional installation options are described briefly below. The installation process for OS-9 Add-Ons and Microware Documentation is similar to the one described above.

OS-9 Add-Ons



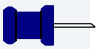
Note

The support for OS-9 add-ons varies from product to product.

The OS-9 Add-Ons are available from the Enhanced OS-9 for <your product> window. This window displays the additional products available with your specific product. The add-ons, which vary from product to product, are provided as separate installations and require individual passwords.

Microware Documentation

Selecting Microware Documentation from the first installer window displays the main documentation menu. From this menu you can view the documentation set or install it to your development system. The documentation is provided in Portable Document Format (PDF). Using the documentation is described in **Chapter 2**.



Note

To view the documentation, you must have a copy of Adobe Acrobat Reader 4.0 or later installed on your host system. Acrobat Reader is provided free from Adobe Systems and is included on your product CD.

View Microware Documentation

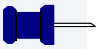
This selection enables you to browse Microware documentation from the CD. You do not need a password to view the documentation.

Install Microware Documentation

This selection installs Microware documentation on your host system hard drive. The process increases the total installation time and uses about 150MB of disk space.

Install Adobe Acrobat Reader

To install Adobe Acrobat Reader on your host system, select Extras from the first installer window. This software (or a later version) is required to view Microware documentation. Acrobat Reader is provided free from Adobe Systems and does not require a user license.



Note

If you already have a copy of Acrobat Reader 4.0 (or newer) installed on your host system, you do not have to make this selection.

Starting Your Project

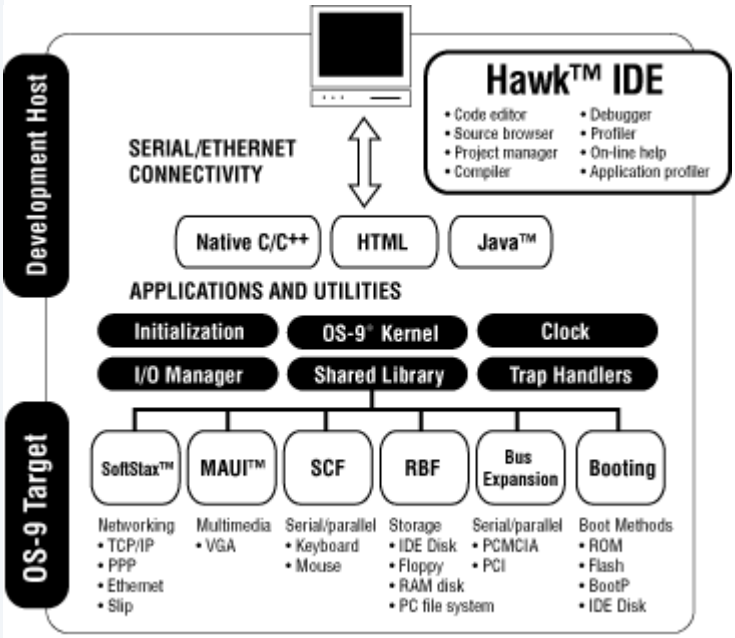
After installing the software on your host system, you are ready to begin your development project. Following are some recommendations on where to begin:

- Read the ***Board Guide*** for your particular reference board. This is essential and should be one of your first objectives. This manual includes detailed descriptions of how to connect your host and target systems and how to port OS-9 to your particular board.
- Familiarize yourself with the Microware's integrated development environment, the Hawk IDE, by reading ***Getting Started with Hawk*** and ***Using Hawk***.

Enhanced OS-9 Runtime Software Components Overview

Enhanced OS-9 features a scalable real-time operating system with specific software modules for creating embedded devices without having to customize system software. **Figure 1-2** shows an overview of the Enhanced OS-9 architecture.

Figure 1-2 Enhanced OS-9 Components



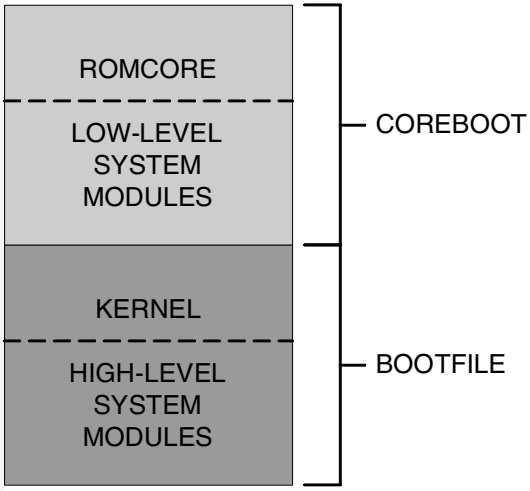
OS-9

At the core of Enhanced OS-9 is the OS-9 operating system and its support modules. OS-9 is an architecturally advanced, high performance real-time operating system available for the PowerPC, ARM, 68K, SuperH, MIPS, and X86/Pentium architectures. At its core is the OS-9 stand-alone microkernel.

Coupled with the power of the microkernel, the unique modular architecture of OS-9 enables dynamic loading of OS-9 system or user application modules while the system is up and running.

To simplify the process of loading OS-9, the OS-9 boot image is divided into two sets of files: the coreboot image and the bootfile image. The coreboot image is the low-level image that boots the reference board to an OS-9 boot menu. The bootfile image is the high-level image that boots the reference board from the boot menu to an OS-9 shell prompt.

Figure 1-3 OS-9 Boot Image



Coreboot Image

The coreboot image boots the system up to the OS-9 boot menu. The coreboot image contains the romcore module merged with several low-level system modules and an embedded utility set. The romcore module is the bootstrap code and is responsible for initializing basic hardware. From the boot menu you can select a booter module which instructs romcore where to find the high-level system to load into memory.

Bootfile Image

The bootfile image contains the kernel and other high-level modules (init module, file managers, drivers, descriptors, and applications). The image is loaded from the device you select in the boot menu. The bootfile normally brings up a shell prompt, but can be configured to automatically start an application.

OS-9 Boot Image

The coreboot and bootfile images can be combined into a single module: the OS-9 boot image. The OS-9 boot image module contains the system bootstrap code, the low-level system modules, the embedded utility set, the kernel, and the high level modules.

Power Management

OS-9 has power management modules that can be included in the bootfile. These modules enable you to create applications that use hardware power management features. This is especially useful for mobile devices.

Fastboot

The OS-9 Fastboot feature is used for those devices or applications that need to be fully operational within just a few seconds. It bypasses some parts of the normal OS-9 boot sequence to achieve this goal.

For More Information

Refer to the OS-9 manual set for more information about the operating system. Refer to your board guide for more information about Fastboot.

Networking

The ability to communicate with other computers and devices is essential for embedded devices. Enhanced OS-9 uses the standard SoftStax I/O implementation; thus, a variety of transport layers can be used.

SoftStax

SoftStax provides a consistent application-level interface using a variety of networking protocols. Additional protocols are included in the LAN Communications Pak.

LAN Communications Pak

The Microware LAN Communications Pak software consists of a TCP/IP protocol stack with UDP support, SLIP/CSLIP support, PPP support, and drivers for supported hardware.

For More Information

Refer to the SoftStax and LAN Communications Pak manual sets for more information about this implementation.

Graphics

Many of today's embedded applications require graphics support. To provide this support, Enhanced OS-9 uses MAUI.

Multimedia Application User Interface (MAUI)

MAUI is a high-level library that manages the display of graphics, text, messaging, and user input as well as audio.

For More Information

Refer to the MAUI manual set for more information about the MAUI system.

Enhanced OS-9 Tools Overview

The development tools included with your Enhanced OS-9 package are described in the following sections.

Hawk™

The Hawk™ development environment is an easy-to-use toolset that enables you to edit, debug, and compile C and C++ code; manage complex software build scenarios; manage solo or team-based changes to your source code with version control; and work with a wide variety of third-party software development tools. Some features of the Hawk™ integrated development system are listed below:

- A project manager for creating and managing complex software projects
- A first-class programming editor
- The latest innovations in C++, from ANSI Standard C++ to tools.h++ from Rogue Wave
- A state-of-the-art Ultra C/C++ compiler
- A source level debugger for debugging C or C++ code
- An API of hundreds of C functions for customizing and extending your environment (the AppBasic scripting language is also available)
- Plug and play functionality for a wide range of third-party software development tools

For More Information

Refer to the Hawk™ manual set for more information.

Ultra C/C++

Ultra C/C++ is an ANSI/ISO C compiler. It also tracks the ANSI/ISO C++ draft standard. This compiler is designed specifically for the Microware real-time operating system, OS-9. The latest algorithms for optimizations have been built into Ultra C/C++ to provide fast, tight code for your real-time applications.

For More Information

The ***Using Ultra C/C++*** manual describes Ultra C/C++ support for various target processors.

RomBug

RomBug is a privileged mode ROM-based debugger for debugging both system- and user-state programs. RomBug runs in supervisor state and takes control of the Central Processing Unit (CPU) when invoked.

For More Information

Refer to the ***Using RomBug*** manual for more information about this debugger.

Utilities

The utilities comprise the OS-9 command program set. While the programs are generally executed from a shell command line, they may also be called from OS-9 programs.

For More Information

Refer to the ***Utilities Reference*** manual for more information about the utilities set.

Chapter 2: Using the Microware Documentation

Microware documentation is provided in Portable Document Format (PDF) and is viewable using Adobe Acrobat Reader 4.0 (or later). This chapter describes the following topics:

- **Installing Acrobat Reader**
- **Viewing Documents with Acrobat Reader**
- **Documentation Conventions**
- **Enhanced OS-9 Documents and Descriptions**

Note

To use the documentation, you must have a copy of Adobe Acrobat Reader, version 4.0 or later, installed on your host development system. Acrobat Reader is a free product from Adobe and can be installed on your host development system from the Microware product CD. You can also download a copy of Acrobat Reader from the Adobe World Wide Web site.

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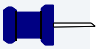
Installing Acrobat Reader

Step 1. Insert the Microware product CD into the CD ROM drive of your host system. Autorun starts the installer and displays the first installer window.

Step 2. Select `Extras`.

Step 3. Select `Adobe Acrobat Reader` and follow the installation instructions.



Note

You can also navigate to `[CDROM DRIVE]:\Install\Acrobat\Win32` from Windows and double click `Setup.exe`.

Viewing Documents with Acrobat Reader

Acrobat Reader is the tool used for viewing Microware documentation. Once Reader is installed on your host system, you can access the documents.

Documentation Overview

The documentation is a collection of PDF files located on your product CD in the `[CDROM DRIVE]:\DOC\PDF` directory. You can access the PDF files through the documentation Home page (`home.pdf`) in the following ways:

- Select `Microware Documentation` from the first installer window. Select `View Microware Documentation`. This starts Acrobat Reader and opens the documentation Home page.

  From the Home page you have several options, including viewing a complete list of documents, performing a full text search, and accessing support information online.

- Open Acrobat Reader from Windows by selecting `Start -> Programs -> Adobe Acrobat -> Acrobat Reader`. Once Acrobat Reader is open, select `File -> Open` and navigate to `[CDROM DRIVE]:\DOC\PDF` and open the `home.pdf` file.

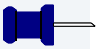
Note

The product CD must be in your CD-ROM drive to use the methods described above.

- Install the documentation PDF files to your host system hard disk and access them through Acrobat Reader. During the installation process you can choose to install the documentation. This copies the PDF files from the product CD to [DRIVE]:\MWOS\DOC.

Once installed you can access the documents by selecting `Start -> Programs -> Adobe Acrobat -> Acrobat Reader`. From Acrobat Reader, select `File -> Open` and navigate to `[DRIVE]:\MWOS\DOC` and open the `home.pdf` file.

The advantage of this method is that you do not need the product CD to view the documents and the process of opening and viewing documents is faster.



Note

Installing the documentation to your host hard drive increases the total installation time and uses about 150MB of disk space.

The Documentation Home Page

The documentation Home page is a PDF file located in `[CDROM DRIVE]:\DOC\PDF` and is the starting point for viewing Enhanced OS-9 documentation. The Home page contains links to the following documentation features:

- ***Getting Started with Microware Products*** manual
- ***Enhanced OS-9 Release Notes***
- List of Manuals

  This lists the documents provided with your release. Selecting one of the document titles in the list opens the PDF file for that document.
- OS-9 Glossary

  The glossary lists and defines OS-9-related terms and acronyms.
- Microware License Agreement

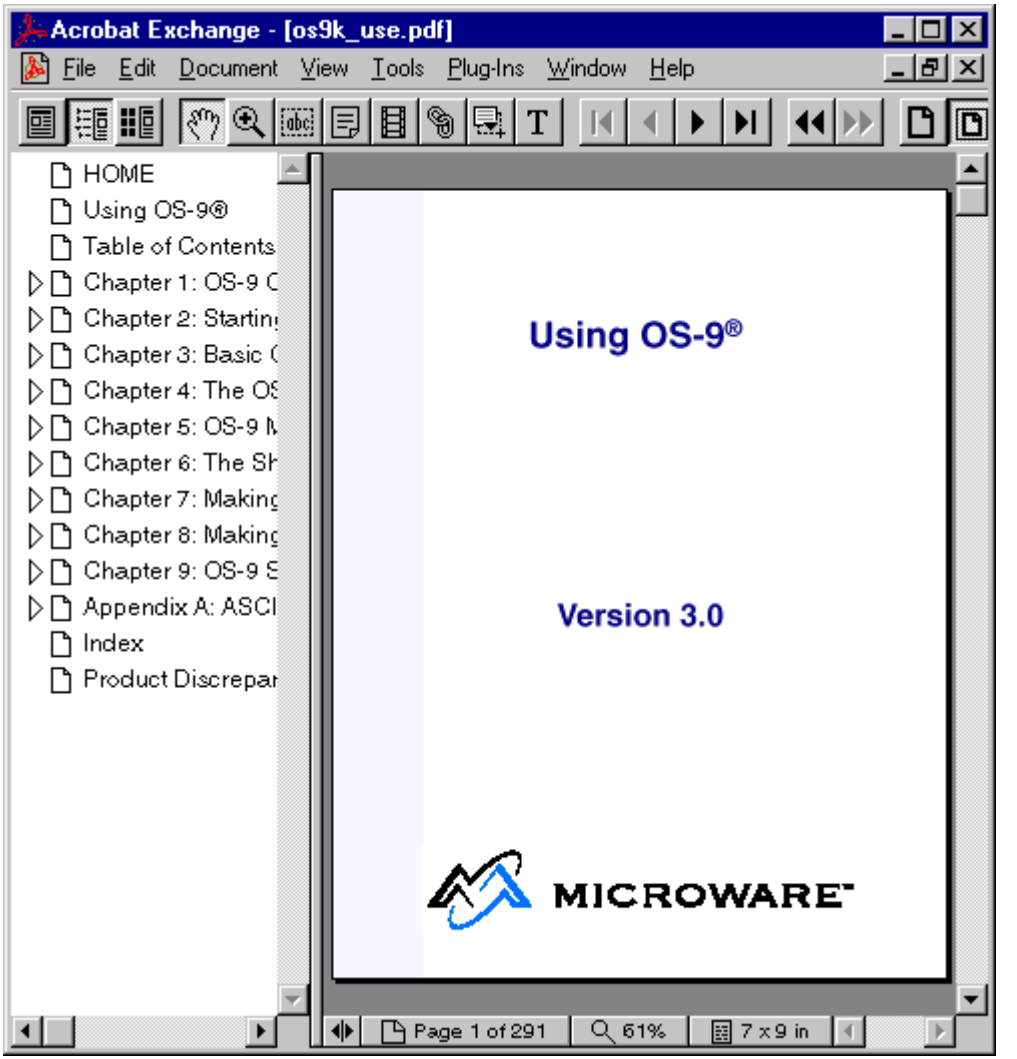
  This describes the licensing issues for Microware products.
- Microware Web Site link

  From the Microware web site you can access customer support, and Microware products and services.

Viewing Documents in Acrobat Reader

Figure 2-1 shows the Acrobat Reader interface with an open OS-9 document.

Figure 2-1 Acrobat Reader Interface



Once you have installed Acrobat Reader on your host system, you can complete the following steps to open a document:

Step 1. Insert the product CD into your CDROM drive.

Step 2. Select `Microware Documentation`.

Step 3. Select `View Microware Documentation`.

Step 4. From the Documentation Home Page, Select `OS-9 Operating System.`

Step 5. From the list of manuals, select `Using OS-9` (for example).

Once the document is open, Acrobat Reader contains several navigation methods. Some of the more common features are described below. For a complete description of how to use the Acrobat Reader interface, see the Acrobat Reader Help file by selecting `Help -> Reader Online Guide`.

Bookmarks

Notice that the screen is divided into two basic parts. The right side displays the document and the left side displays the bookmarks. The bookmarks are similar to a table of contents and list the major sections of the document. You can click on a bookmark and that particular section displays.

Each document contains a Home bookmark. Clicking Home displays the documentation Home page.

Links

Text printed in blue indicates a link to other related information. By clicking on the blue text, you can jump to that information.

Text Selection

The text selection tool enables you to copy text from the manual and paste it into your application or any text editor. You cannot edit or change information directly in the online manual.

Full Text Search in Acrobat Reader

The Enhanced OS-9 documentation includes a searchable index of the entire document set. To enable this function, complete the following steps:

Step 1. Open the Acrobat Reader application.

Step 2. From the menu bar select `Tools -> Search -> Indexes`.

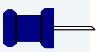
Step 3. In the dialog box that opens, navigate to the `[CDROM DRIVE]:\DOC\PDF` directory.

Step 4. Select `index.pdx`.

Step 5. Click `Open`.

Step 6. Click `OK`.

This procedure enables the full text search function and you will not have to load the index again.



Note

If you chose to install the documents on your host system hard drive, you must navigate to that directory in step 3 to select the index file. You can also select and search multiple indexes in multiple locations.

To access the full text search feature, select `Tools -> Search -> Query` from Acrobat Reader.

Documentation Conventions

Online Documentation

This manual is provided on CD-ROM in Acrobat PDF format. Text printed in blue indicates a link to other related information. By clicking on the blue text, you can jump to that information.

You can also easily navigate the online documents by using bookmarks and navigation buttons. Bookmarks are structured like a table of contents and appear on the left side of your screen. To jump to an item in the bookmark list, simply click on the item. Navigation buttons are provided in the Acrobat Reader user interface.

Where online manuals contain code snippets, you may want to save some time and effort by copying from the manual and pasting the code snippets into your application. While you cannot edit or change information in the online manual, you can print any page or number of pages. You can copy from the online manual and paste both text and graphics into another application, such as a text editor.

Documentation Conventions

Bold Italic font is used where references are made to other manuals.

`Courier` font is used for text that appears on a screen or within code.

`Magenta` bold font is used for text that you enter in response to an on-screen procedure.

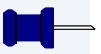
Enhanced OS-9 Documents and Descriptions

This section provides a list and short description of the Enhanced OS-9 documentation set.

Board Guides

Board guides provide a detailed description of the following:

- Connecting a reference board to your host system.
- Operating system information specific to a reference board.



Note

If you are porting OS-9 to a reference platform or modifying specific parts of the operating system, it is recommended that you start your project by reading the board guide for your particular reference board.

OS-9

The OS-9 documentation includes the following manuals:

Using OS-9

Using OS-9 is the basic user reference manual for OS-9. The manual discusses the file structure and utilities available for using OS-9, the advanced utilities, and topics of interest to system managers.

Using OS-9 Threads

Using OS-9 Threads describes the Microware implementation of POSIX threads.

OS-9 Technical Manual

This manual is a high-level introduction to the technical aspects of OS-9. It is also a function call reference. The first seven chapters familiarize you with the OS-9 operating system. The remainder of the manual provides specific information about function calls, interprocess communication example code, and error messages.

OS-9 Porting Guide

This manual describes porting OS-9 to custom hardware.

OS-9 Device Descriptor and Configuration Module Reference

This manual provides reconfiguration information for device descriptors and configuration modules.

Power Management Subsystem Specification

This manual describes power management policy as well as provides example sources enabling development of power aware device drivers and applications.

OS-9 for 68K

The OS-9 for 68K documentation includes the following manuals:

Using OS-9 for 68K Processors

This manual is the basic user reference manual for OS-9. The manual discusses the file structure and utilities available for using OS-9, the advanced utilities, and topics of interest to system managers.

OS-9 for 68K Processors Technical Manual

This manual describes four levels of OS-9 modularity, I/O processing, memory modules, and program modules. It is designed to be used with the OS-9 for 68K Processors Technical I/O Manual.

OS-9 for 68K Processors Technical I/O Manual

This manual is a supplement to the ***OS-9 for 68K Technical Manual***. It provides further information to help you create new file managers and device drivers, and supplies examples that you can adapt to your specific system needs. A basic understanding of the OS-9 for 68K Technical Manual is assumed.

OS-9 for 68K Processors OEM Installation Manual

This manual describes how to install OS-9 on your host and target systems. It also describes building boot code and getting OS-9 up and running on your target.

OS-9 for 68K Processors BLS Reference

This manual provides information and instructions for installing OS-9 for 68K version 3.0.3 and later on a specified target from a Board Support Pak (BSP).

OS-9 for 68K PC File Manager

This manual provides information and instructions for the PC File Manager, which enables you to transfer files between your PC-DOS and OS-9 systems.

Power Management Subsystem Specification

This manual describes power management policy as well as provides example sources enabling development of power aware device drivers and applications.

Using TrueFFS for OS-9

This manual provides information and instructions to install, configure, and understand TrueFFS for OS-9. TrueFFS for OS-9 is a flash file system I/O component package that allows you to read and write to flash memory under OS-9 in the same way you use disk memory.

Networking/Communications

This group of documents describes the integrated communications and networking framework for OS-9. It includes the following manuals:

Using SoftStax

SoftStax supports delivery of network multimedia data to applications and hardware devices. This manual explains the following:

- SoftStax architecture and design philosophy
- Open Systems Interconnect (OSI) Model for networking
- SoftStax components
- Various data transmission methods used by SoftStax
- SoftStax protocol stacking
- SoftStax driver conventions
- Creating library extensions
- mbuf facility installation and use of its functions

SoftStax Programming Reference

This manual contains descriptions of the telecommunications Application Programmer Interface (API) functions.

SoftStax Porting Guide

This guide explains how to write drivers in a SoftStax environment and provides information on porting SoftStax components and drivers to your delivery system.

Using LAN Communications Pak

This manual provides information and instructions for LAN Communications Pak. LAN Communication Pak software is a TCP/IP suite that supports the following protocols: IP, TCP, UDP, ICMP, RIP, SLIP/CSLIP, and PPP. This package supports the BSD socket API and network /host functions for local or DNS client support.

LAN Communications Pak Programming Reference

This manual contains descriptions of the LAN Communications Pak functions.

Using Network File System/Remote Procedure Call

This manual provides information and instructions for using Network File System/Remote Procedure Call (NFS/RPC).

This product assumes that you are familiar with OS-9 real time operating system and NFS/RPC programming. It also assumes that you are using LAN Communications Pak v3.2 or higher.

Remote Procedure Call Programming Reference

This manual describes C library routines for Remote Procedure Call (RPC). It includes the OS-9 RPC C library and OS-9 XDR C library.

Using ISDN Communications Pak

The Integrated Services Digital Network (ISDN) is a single telecommunications network that enables multiple digital channels to operate through regular copper telephone wires. This manual provides information and instructions for using ISDN with your OS-9 system.

EMANATE™ SNMP for OS-9 Notes

EMANATE™ SNMP for OS-9 is third-party software from SNMP Research International, Inc., that Microware has a license to resell. This document describes how to configure your OS-9 target for SNMP. Documentation from SNMP Research International, Inc., is included on your Enhanced OS-9 CD.

Using ATM Base Pak

This manual describes ATM connectivity for small embedded devices that communicate over an ATM network.

Using Soft-ATM™ for OS-9

This manual describes an integrated ATM signalling stack that provides the switched virtual circuits (SVC) necessary for on-demand ATM services. Soft-ATM™ for OS-9 is designed for developing both user-side and network-side ATM products.

Using X.25 Communications Pak

This manual provides information and instructions for installing X.25 on your development system and porting X.25 components and drivers to your delivery system.

Graphics/Audio

Using MAUI

The Multimedia Application User Interface (MAUI) is an Application Programming Interface (API) that provides an extensive set of low-level graphical and communications services that can be used in interactive television decoders connected to telephone, cable, and wireless networks.

MAUI Programming Reference

This manual contains the functions and data types defined in MAUI. This includes syntax, a brief description, parameter definitions, errors, and cross-references to related information.

MAUI Porting Guide

This manual provides information and instructions for porting the MAUI environment to your hardware.

Using the Sound Driver Interface

The Sound Driver Interface enables MAUI applications to play and record sound data in various digital formats. The Sound Driver Interface uses the MAUI Multimedia File Manager and error codes, but is otherwise independent of other MAUI APIs. This manual provides instructions for adding play and record capabilities to your MAUI applications.

Development Tools

Getting Started with Hawk™

This manual provides an overview of the Hawk™ integrated development environment as well as a sample Hawk™ project.

Using Hawk™

This manual provides information and instructions for using Hawk ™ and customizing the Hawk interface.

Using Hawk™ Macros

This manual provides information and instructions for using the macros supplied with the Microware Hawk Integrated Development Environment.

Using Ultra C/C++

Ultra C/C++ is an ANSI/ISO C compiler. It also tracks the ANSI/ISO C++ draft standard. It is designed for use with OS-9. Optimization algorithms are built into Ultra C/C++ to provide fast, efficient code for your real-time applications.

Ultra C Library Reference

This manual provides information about the functions provided in the C libraries for OS-9 systems.

Ultra C/C++ Processor Guide

This guide describes Ultra C/C++ support for various target processors.

Using RomBug

RomBug is a ROM resident debugger enabling debugging of OS-9 components. RomBug may alternatively be loaded in RAM.

Utilities Reference

This reference manual contains descriptions and examples of each of the OS-9 command programs. While the programs are generally executed from a shell command line, most may also be called from OS-9 programs.

Rogue Wave Ultra C++ Class Library Reference

Standard C++ Library User's Guide, Tutorial, and Class Reference

This manual is an introduction to the Rogue Wave implementation of the Standard C++ Library.

Standard C++ Library Class Reference

This reference guide lists the classes, algorithms, and function objects provided by this release of Rogue Wave's Standard C++ Library.

Standard C++ Library Iostreams & Locale User's Guide

This manual describes locales in the Standard C++ Library. Consult the Class Reference for more complete information.

Standard C++ Library Iostreams & Locale User's Reference

This document lists the classes, facets, functions, and pre-defined streams found in the iostreams and locale portion of the Standard C++ Library.

Tools.h++ User's Guide (V 7)

This manual describes Tools.h++, Rogue Wave's foundation class library.

Tools.h++ Class Reference (V 7)

The Tools.h++ Class Reference describes all the classes and functions in Tools.h++.

Documentation by Common Task

OS-9 Application Programming

The documents in this section provide the fundamental information you need to use OS-9 and the development tools that come with it. The ordering of this section indicates the recommended sequence for using the documents, but feel free to change the sequence to best fit your needs.

- ***Using OS-9*** contains fundamental information about OS-9.
- ***Using OS-9 Threads*** contains information about the Microware implementation of POSIX threads.
- ***Using Hawk™*** contains information on using the Microware Hawk™ IDE.
- ***Using Ultra C/C++*** contains information on using the C/C++ compiler supplied with Microware Hawk™.
- ***Using Hawk Macros*** describes how to extend Microware Hawk™ using macro languages or DLLs.
- ***Using LAN Communications Pak*** tells you how to program LAN network aware applications for OS-9.
- ***Using MAUI*** introduces you to the concepts behind graphics programming for OS-9.
- ***Using SoftStax*** tells you how to program network aware applications for OS-9.
- ***Using Network File System/Remote Procedure Call*** tells you how to program NFS/RPC applications for OS-9.

Documents for Porting OS-9 to Other Hardware

The following manuals describe how to port the various components of this release of OS-9 to custom hardware. The ordering of this section indicates the recommended sequence for using the documents, but feel free to change the sequence to best fit your needs.

- ***OS-9 Porting Guide*** provides the information you need to configure OS-9 to your hardware.
- ***Using RomBug*** tells how to use the ROM debugger.
- ***OS-9 Device Descriptor and Configuration Module Reference*** gives you information on OS-9 device descriptors.
- ***MAUI Porting Guide*** contains information on how to create MAUI graphics drivers for your hardware.
- ***SoftStax Porting Guide*** tells how to port Softstax to your custom hardware.

The Reference Manuals

The manuals in this section provide reference information and advanced level topics for OS-9 and the different components of this release.

- ***LAN Communications Pak Programming Reference*** is a function reference for the LAN Communications Pak.
- ***MAUI Programming Reference*** describes the functions for the MAUI API.
- ***SoftStax Programming Reference*** describes the programming API.
- ***OS-9 Technical Manual*** provides a high-level introduction to the technical aspects of OS-9 and provides a function call reference.
- ***Remote Procedure Call Programming Reference*** describes the C library routines for Remote Procedure Call (RPC).
- ***Utilities Reference*** describes the command line utilities supplied with OS-9.
- ***Ultra C Library Reference*** describes the functions available in the C library that is supplied with OS-9.

- ***Ultra C/C++ Processor Guide*** describes Ultra C/C++ support for various target processors.
- ***Rogue Wave Standard C++ Library User's Guide, Tutorial and Class Reference*** describes the Rogue Wave Standard C++ Library and how to use it.
- ***Rogue Wave Standard C++ Library Class Reference*** describes the classes, algorithms, and function objects in the Rogue Wave Standard C++ Library.
- ***Rogue Wave Standard C++ Library IO Streams and Locale User's Guide*** describes I/O streams and internationalization.
- ***Rogue Wave Standard C++ Library IO Streams and Locale User's Reference*** is an alphabetical listing of the classes, facets, functions, and pre-defined streams found in the IO streams and locale portion of the Standard C++ Library.
- ***Tools.h++ User's Guide (V7)*** describes how to use the Rogue Wave Tools.h++ (a C++ foundation class library).
- ***Tools.h++ Class Reference (V7)*** describes all the classes and functions in the Rogue Wave Tools.h++.

Password Protected Documentation

Some Microware documentation, as well as some third-party documentation, provided on the product CD is password protected. These documents are installed to your host system during software installation. Password-protected documents, and the directories in which they are installed, are noted on the Microware Documentation Home Page.

Chapter 3: Customer Support

This chapter includes the following sections:

RadiSys.
MICROWARE SOFTWARE

Comments About This Documentation

We are committed to providing you with the best documentation possible. If you have ideas for improving the documentation, please share them with us.

Please include the following information in your communication:

- Manual Name:
- Revision:
- Chapter and page number, or copy of page.

Please contact the Application Support Engineering Department at the following address:

RadiSys Microware Communications Software Division, Inc.
Application Support Engineering
1500 N.W. 118th Street
Des Moines, Iowa 50325

or contact us by email at the following address:

support@microware.com

Microware Application Support Engineering

Microware offers complete solutions to help you build your embedded systems projects. This includes an expert staff of experienced engineers and trainers that back up OS-9, the Microware development tools, and the component products.

If you need help installing, configuring, or using OS-9 or any Microware product during the 35-day warranty period, you are encouraged to contact our engineers in any of the following ways:

- Visit our website, `www.microware.com`, and submit your questions to our engineers by filling out the Incident Report form.
- Send your e-mail to `support@microware.com`.
- Call 515-223-8000 anytime of the day or night. Our engineers are available from 8:00 AM to 6:00 PM CST.
- We are constantly building our database of problems and solutions and offer automated access to our knowledge base to customers with active support/maintenance contracts. Look for the link to "Web First" on the Technical Support page of our Web site.

Microware TECH-CHECK™

We also have a state-of-the-art call tracking system that maintains a complete record of your product concerns and questions. You can assist us in handling your questions more effectively by using Microware TECH-CHECK™ when contacting support.

Microware TECH-CHECK™ is a program wizard that asks you a series of questions about your system, your questions/concerns, and your contact information. Microware TECH-CHECK™ creates a text file, which can be mailed to `support@microware.com`.

You can access Microware TECH-CHECK™ from the `Start -> Program Files -> <Microware Product>` start menu. The Microware TECH-CHECK™ opening screen is shown in **Figure 3-1**.

Figure 3-1 Microware TECH_CHECK™

Note

Microware offers several levels of support services. Check out our website to see current descriptions of our Standard, Gold, and Sterling programs.

Training Opportunities

If you would like to learn more about the OS-9 operating system, we invite you to attend one of our OS-9 for Embedded Systems training seminars. We conduct a seminar every month at our headquarters in Des Moines, Iowa. We also offer regional classes in strategic areas around the country throughout the year. Check the website to see an up-to-the minute class schedule and syllabus. You can register on-line.

Contacting Microware Support

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Product Discrepancy Report

To: Microware Customer Support

FAX: 515-224-1352

From:_____

Company:_____

Phone:_____

Fax:_____Email:_____

Product Name:

Description of Problem:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Host Platform_____

Target Platform_____

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