



# **Getting Started with DAVID®**

## **Version 2.5**

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# Chapter 1: Introduction

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DAVID (Digital Audio/Video Interactive Decoder) is an OS-9 real-time operating system software environment for set-top decoders used in both interactive digital television networks and digital broadcast environments.

This book is for original equipment manufacturers (OEMs) designing set-top boxes to run OS-9, and for software application developers using OS-9 on the Motorola Hellcat development platform. This manual provides the information necessary to establish your DAVID environment.

- This chapter describes the contents of this DAVID release and briefly describes the DAVID components.
- **Chapter 2** provides installation and configuration information for both OEMs designing set-top boxes to run OS-9 and application developers using OS-9 on the Motorola Hellcat.
- **Chapter 3** briefly describes the DAVID documentation and provides Microware customer contact information.



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# What's Included in DAVID

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## Software

### DAVID

The DAVID Installation Software Package comes on a single CD-ROM. The software includes:

- Applications programs
- Utilities
- Sample utilities
- Header files and libraries
- Graphics capabilities
- Protocol software driver object code and sources
- Sample hardware driver object code and sources

### Development Tools

The DAVID development toolset features the Microware Hawk™ development environment. The Hawk™ package provides project management, compiling using the Ultra C/C++ highly optimizing compiler, context sensitive editing, source and assembly language debugging, target system and application profiling, concurrent multi-task and multi-target debugging, and version control system integration options.



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### For More Information

Refer to the Hawk™ manual set for more information.

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## Documentation

Documentation for DAVID includes the following:

- This ***Getting Started with DAVID*** manual
  - Release notes providing late-breaking information
  - Online documentation for all Microware products, including documentation specific to DAVID.
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### For More Information

A complete list of DAVID documentation, along with a brief description of each manual, is provided in **Chapter 3**.

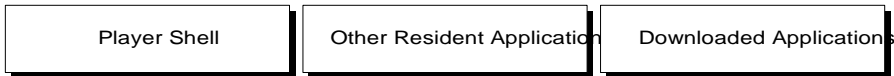
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# DAVID System Architecture

**Figure 1-1** shows the DAVID architecture. Each software subsystem is briefly described in the following sections.

**Figure 1-1 DAVID System Architecture**

## Applications



## APIs



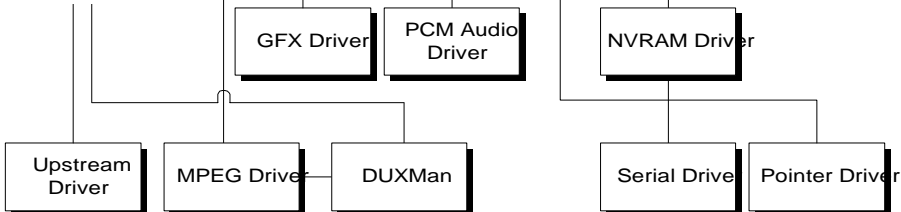
## System Modules



## File Managers



## Device Drivers





## Applications

### Player Shell

The player shell is the first process to execute in a DAVID system. It works with the operating system software to perform basic system initialization, channel tuning, and interactive applications from the network.



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#### Note

OEMs note that the player shell provided with DAVID illustrates one possible implementation of a player shell. You will want to port and implement your own version of the player shell for your specific network/STB deployment.

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#### For More Information

Player Shell is described in detail in the ***DAVID Utilities and Applications*** manual.

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## Other Resident Applications

Fdraw	The fastdraw program demonstrates how quickly MAUI performs draw block operations.
Aloha	A complete MAUI program, including a message loop, is presented in Aloha.
Fcopy	The fastcopy program shows you how quickly MAUI performs copy operations. Print a copy of the source to understand how fastcopy works.
Hello	A sample MAUI program.




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### For More Information

See ***Using MAUI*** for more information about these applications.

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## Utilities

sysstrap	P2 module used by user-state applications to access certain system-state capabilities.
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### For More Information

See ***DAVID Utilities and Applications*** for more information about these utilities.

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## Application Programming Interfaces (APIs)

### ITEM

ITEM provides applications a network-independent API. Since applications can use generic call control library calls to communicate with the Microware SoftStax I/O system, they do not need to know the type of network being used. This is important if application portability is a requirement. You can use ITEM to communicate with, and over, connection-oriented or connectionless networks.



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#### Note

SoftStax was formerly called the SPF Base Pak.

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### UpLink

UpLink is a command protocol API that resides between DAVID set top box applications and the network. UpLink is used to establish network communications, request data from a server, control server data flow, and manage network communications.

### *mw*MAUI

The MAUI APIs provide support for graphics, windowing, messaging, and sound.

# System Modules

## OS-9 Kernel

OS-9 is an architecturally advanced, high performance real-time operating system available for the IBM/Motorola, Intel, and ARM/StrongARM microprocessor families. At its core is the OS-9 stand-alone microkernel.

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

## Other Modules

Other operating system modules include:

CDB	The Configuration Descriptor Block contains a list of devices and capabilities of the particular software environment in a device. It is accessed through the <code>mwMAUI_CDB</code> API.
Fonts	There is a single bitmap font supplied in the DAVID environment which can be accessed through the <code>mwMAUI_Text</code> API. Additional bitmap and outline fonts may also be included by the OEM.
Init	The <code>Init</code> module contains a list of system parameters for the OS-9 microkernel.
FLASH	The <code>FLASH</code> API allows application to write modules to the flash memory of a device
SSM	The System Security Module provides memory protection for applications.
Math	The <code>Math</code> module provides software floating point support for processors that do not support floating point in hardware.

## File Managers

OS-9 file managers are a collection of major subroutines accessed through an offset table to provide I/O for a process to a physical device. The OS-9 file managers are position-independent, reentrant, and ROMable, allowing one manager to be used for an entire class of devices having similar operational characteristics. These file managers reside in OS-9 as standard memory modules, can be shared by multiple processes and physical devices, and can be included as needed for specific applications. Following is a list of file managers included with DAVID:

MFM	The mwMAUI File Manager provides a consistent interface for accessing the Graphics capabilities of the device.
MPFM	The Motion Picture File Manager provides a consistent interface for accessing the MPEG capabilities of the device.
NRF	The Non-Volatile RAM File manager provides a flat file system using battery-backed RAM memory.
PIPEMAN	Pipeman supports interprocess communication through FIFO memory buffers called pipes.
SCF	SCF is used with sequential-character oriented devices (such as terminals, modems, and printers).
mwSoftStax	mwSoftStax provides a consistent application-level communications interface. SoftStax contains independent protocol modules that can be stacked together according to the specific network interface being used.

## Device Drivers

GFX	Manipulates the graphics device
PCM Audio	Manipulates the audio device
NVRAM	Manipulates the battery-backed RAM chips
Upstream	Manipulates the back-channel of the device (if one exists)
DUXMan	Manipulates the demultiplexer
MPEG	Manipulates the MPEG decoder device(s)
Serial	Manipulates the remote control input device
Pointer	Manipulates the remote control pointing input device

# Chapter 2: Getting Started with DAVID

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## **DAVID Installation Pak**

The DAVID Installation Pak is for original equipment manufacturers (OEMs) designing set-top boxes to run OS-9.

## **DAVID Application Pak**

The DAVID Application Pak is for application programmers to develop applications for set-top boxes.

This chapter includes the following sections:

- **System Requirements**
- **DAVID Source File Directory Structure**



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# System Requirements

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## Host Development System Requirements

A Windows<sup>®</sup>-based host development system, with the appropriate Hawk<sup>™</sup> tool set are required for using DAVID.

### Hardware Requirements

- RAM:  
32 MB for Windows 95  
64 MB for Windows NT
- Disk Space: Required disk space varies according to what MPEG streams are being used.

### Software Requirements

- Microsoft Windows<sup>®</sup> 95, Windows<sup>®</sup> 98 or Windows<sup>®</sup> NT
- Network: Ethernet



## Target System Requirements

### Hardware Requirements

For ease of development, 16-32 MB of RAM is recommended.

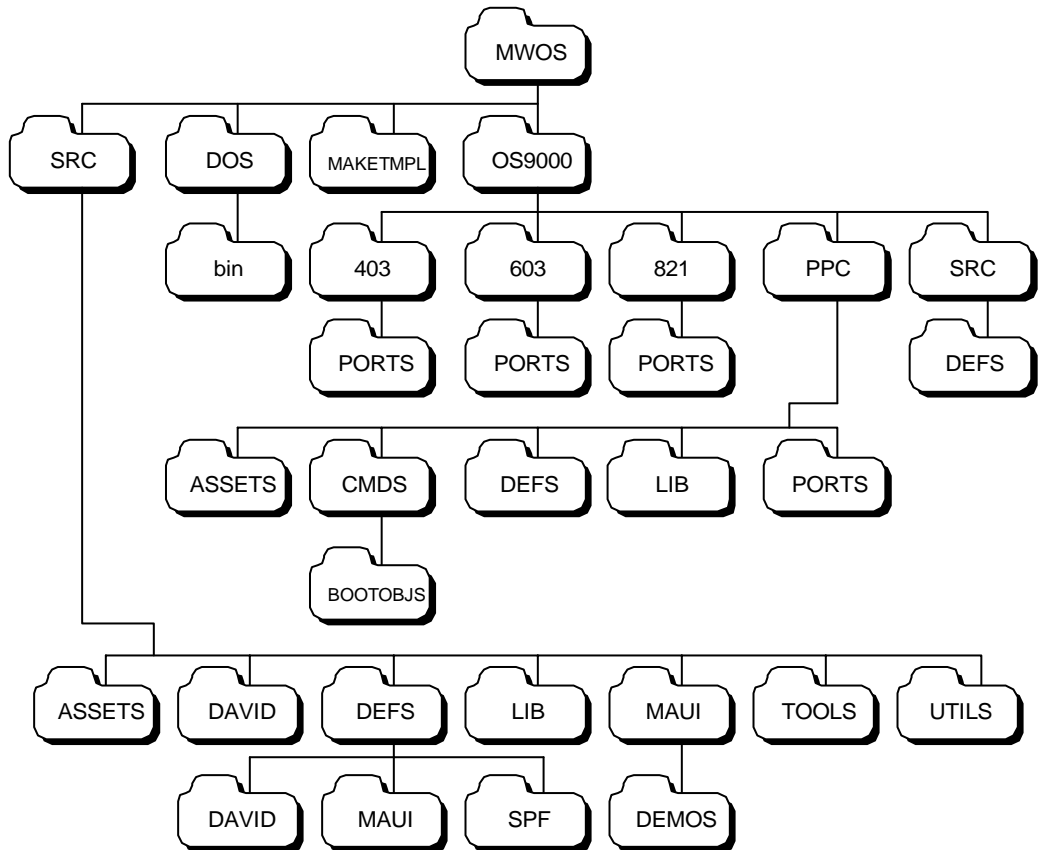
### Software Requirements

DAVID can be implemented on any OS-9 system that supports the following operating system release levels:

- OS-9: OS-9 for Power PC v2.1.1 or later

# DAVID Source File Directory Structure

**Figure 2-1 Source File Directory Structure for DAVID.**



## DAVID Porting Overview

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After porting OS-9000 to your target device, there are several DAVID-specific drivers that need to be written or ported as well. These are listed in the following table along with where they are documented.

**Table 2-1 DAVID-Specific Drivers and Documentation**

<b>Driver</b>	<b>Documentation</b>
SPI, FLASH	<i>Using NullFM</i>
NRF	<i>Using NRF</i>
SPF	<i>SPF Porting Guide</i>
DUXMan	<i>Using DUXMan</i>
MPFM	<i>MPFM Porting Guide</i>
MAUI	<i>MAUI Porting Guide</i>



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# Product Discrepancy Report

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To: Microware Customer Support

FAX: 515-224-1352

From: \_\_\_\_\_

Company: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Product Name:

Description of Problem:

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Host Platform \_\_\_\_\_

Target Platform \_\_\_\_\_



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