Sound and Motion J300

Owner's Guide

Order Number: EK–JXPVS–OG. A01

Contents

3 Creating a Multimedia System

A For Digital Multivendor Customer Services Representatives

B   Hardware Specifications

Glossary

Index

Figures

Tables

Preface

Guide Overview

Purpose   This guide describes the Sound and Motion J300 option module for Alpha AXP systems; it explains how to connect cables between the module and common peripherals, and includes an overview of hardware, software, and standards.

Audience   This guide is for any individual who may install, use and diagnose problems with the Sound and Motion J300 option module.

Contents   This guide lists the features of the Sound and Motion J300 option module. Full instructions for installing the module into DEC 3000 systems are not included. Use the TURBOchannel option module installation instructions in the documentation that came with your system.

Instructions for adding standoffs to the option module, in preparation for installation in the DEC 3000 Model 300 AXP system, are included.

The guide contains three chapters, two appendixes, a glossary, and an index.

- Chapter 1 describes the Sound and Motion J300 option module, and TURBOchannel interconnect technology; it also provides an overview of the Multimedia Services for DEC OSF/1 AXP software with which you can develop multimedia applications. It lists peripherals you may wish to use with the Sound and Motion J300 option module.

- Chapter 2 provides installation instructions, shows you how to add cables to the option module, and provides diagnostics to help solve problems.

- Chapter 3 shows you how to cable a multimedia workstation using the Sound and Motion J300 option module.

- Two appendixes list Digital services information and hardware specifications.

- A glossary defines frequently used multimedia terms.

- An index provides references to information within the guide.

Conventions

The following conventions are used in this guide:

Note	Notes provide general information about the current topic.
pst-t	A word in this typeface indicates a command that you must enter from the keyboard at the console prompt (>>>). For example, test.
[ ]	The information contained within these brackets is optional. The brackets are not part of the command syntax and should not be typed.
# **df /usr**	In interactive examples, text you enter appears in a **bold** typeface.
❶	A number in a circle corresponds to a number in an illustration.
Return	A key name shown enclosed indicates that you press that key on the keyboard.

1
Multimedia

Overview

Chapter

This chapter provides information about the following:

- Sound and Motion J300 option module
- Multimedia Services for DEC OSF/1 AXP software
- TURBOchannel interconnect technology

Technology

Multimedia is a technology with which you can capture, alter, and present information as still or animated images, and as live, full-motion video with sound. The Sound and Motion J300 option module offers the technical advantages of sound and live video at the desktop: information can be captured in real-time, stored locally, and then transmitted over the network to a distant multimedia system. Users of Digital Equipment Corporation's Alpha AXP systems can add the Sound and Motion J300 hardware, and multimedia software development tools, to a computing environment that already provides desktop computing, industry-standard personal productivity tools, and access to distributed applications and resources.

The Sound and Motion J300 Product

Overview

The Sound and Motion J300 option module permits you to add multimedia capabilities to your Alpha AXP system by simply installing one two-board TURBOchannel option module. There is no need to remove or change a color frame buffer or a graphics module that may already be in place.

The Sound and Motion J300 option module allows you to receive and transmit video and sound using laser-disc players, video cassette recorders, video cameras, speakers, headsets, headphones, cassette players, and more.

Features

The Sound and Motion J300 option module provides:

- Real-time video capture of video signals in NTSC (640 x 480 pixels) format, PAL, or SECAM (768 x 576 pixels) format

- Real-time video output in NTSC or PAL format

- Video input and output, in either composite or S-video format

- Full–frame video data storage

- JPEG Compression and decompression of the video signal

- Scaling and filtering of video signal before compression

- Dithering from 24 bits/pixel to 2-to-256 colors

- Scaling and filtering of the video stream prior to dithering, independent of pre-compression scaling

- Genlock to external devices

- Graphics overlays

- Video capture (video-in) in 4:2:2 YUV format, in 8-bit pseudo-color or 8-bit grayscale.

- CD–quality analog audio I/O

- Multiple audio sample rates from 8-bit (8 kHz) to 16-bit (up to 48 kHz)

- Digital audio input/output for high quality audio mixing

- Headphone and microphone I/O connector for voice quality audio

Configuring Multimedia Systems

You can attach one or two Sound and Motion J300 option modules to any base system that supports the Alpha AXP architecture and TURBOchannel interconnect technology.

Note that the number of TURBOchannel option modules you can install in any one system varies according to the system. See Table 1 for storage and memory recommendations, and the number of TURBOchannel slots available per base system.

Table 1   Storage, Memory and TURBOchannel Slots

DEC 3000 AXP Systems	Option Slots	Memory	Disk Storage
Model 300	2	32 MB[1]	1+ GB
Models 400/400S and 600/600S	3	32 MB[1]	1+ GB
Model 500X	5	32 MB[1]	1+ GB
Models 500/500S and 800/800S	6	32 MB[1]	1+ GB

[1]Systems perform better with additional memory.

Software Requirements

You need a minimum revision of the following software with your multimedia system:

- DEC/OSF1 Version 1.3

- Multimedia Services for DEC OSF/1 AXP runtime subset, Version 1.0

Peripherals

You can add any of the following devices to your DEC 3000 AXP system. Figure 5 in Chapter 3 shows you how to cable a multimedia system.

- RRD42 compact disc drive (for software installation)

- Laser disc player

- Switcher

- Digital Audio Tape (DAT) player

- Compact disc player

- Audio amplifier

- Headphone

- VCR

- Video camera

- Powered speakers

Multimedia Services for DEC OSF/1 AXP Software

Software Overview

Multimedia Services for DEC OSF/1 AXP is the multimedia audio and video enabling software for DEC 3000 Alpha AXP systems. The software helps developers create multimedia end-user applications and enhance existing applications using the Sound and Motion J300 option module.

Subsets

Multimedia Services for DEC OSF/1 AXP software consists of two products: a runtime subset and a developers subset.

- The runtime subset provides the runtime multimedia software that enables the built-in audio on Alpha AXP workstations, provides a multimedia server, audio and video drivers, audio and video record and playback utilities, and audio and video clips.

- The developer's subset includes the contents of the runtime subset, support for waveform audio recording and playback, support for video capture and playback, support for video compression and decompression to manage data stored in AVI files, example applications and a programmer's manual. A larger selection of audio and video clips is available to developers as part of this kit.

Refer to the following documents for more information about the Multimedia Services for DEC OSF/1 AXP software products:

- *Multimedia Services for DEC OSF/1 AXP Installation Guide*, part number AA–Q0ANA–TE

- *Multimedia Services for DEC OSF/1 AXP Programmer's Guide*, part number AA–Q0APA–TE

- *Multimedia Services for DEC OSF/1 AXP Runtime Guide*, part number AA–Q0AQA–TE

TURBOchannel

Technology TURBOchannel technology is low-cost, high-performance module interconnection technology based on hardware, software, and firmware components. At the core of the TURBOchannel hardware is a synchronous asymmetrical I/O channel used to connect option modules to a system module. The channel is asymmetrical in that the system module has read or write access to any option module, and an option module only has read or write access to the system module. Option modules have no access to other option modules.

Option Modules The TURBOchannel modules that make up an option vary in width and height, but have similar shapes and connectors, and can occupy more than one option slot. One or more connectors on the bottom of the module attach the module to the base system. One end of a TURBOchannel module has a connector that allows the module to connect to an external device. The Sound and Motion J300 option module follows the same design characteristics.

2
Sound and Motion J300 Installation

Overview

Chapter

This chapter provides the following information about installing the Sound and Motion J300 option module in your system:

- Unpacking the Parts Kit
- Installing the Sound and Motion J300 Option Module
- Connecting Cables to the Module
- Verifying the Installation
- Diagnosing and Solving Problems

Module Connections

The Sound and Motion J300 option module is a two-board module assembly that occupies one TURBOchannel option slot and provides connections for the following:

- Headset or handset
- Headphone or microphone for voice quality audio
- Digital audio devices
- Analog audio devices
- Video-in and video-out devices

Unpacking the Parts Kit

Kit Contents   The Sound and Motion J300 parts kit (Figure 1) contains the following items:

❶ Sound and Motion J300 option module

❷ MJ to two-3.5 mm (1/8 in) jack audio adapter cable

❸ Documentation

❹ Three 3.5 mm (1/8 in) stereo phone-plug to dual RCA-jack cables

❺ Disposable antistatic wrist strap

❻ Two aluminum spacers

❼ Two Phillips mounting screws

Use ❻ and ❼ on DEC 3000 Model 300 AXP systems.

❽ Two BNC-to-RCA adapters

❾ Two S-video to two-RCA adapters

_____ **Note** _____

Hereafter, the following parts are referred to in shortened form:

❷ — Audio adapter cable
❹ — Phone plug-to-RCA cable
❽ — BNC-to-RCA adapter
❾ — S-video to RCA adapter

Figure 1 Contents of Sound and Motion J300 Package

MLO-010847
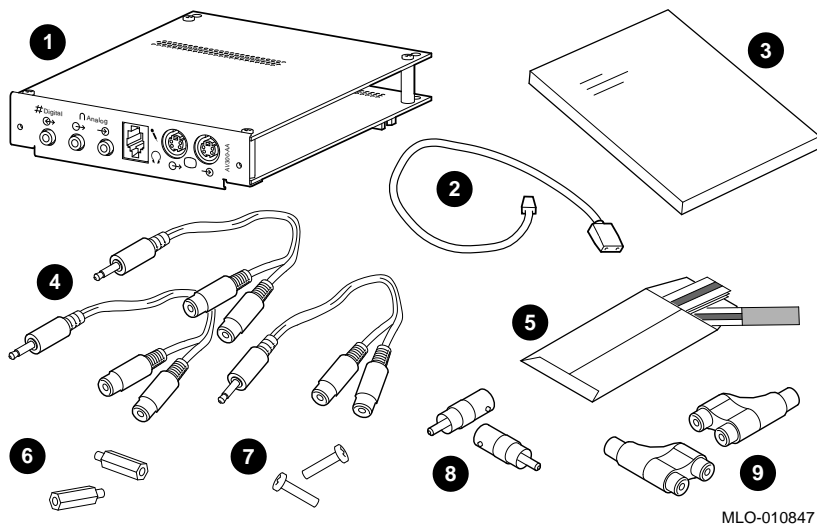
Label any cables you remove from the shipping carton.
Multimedia applications use numerous peripheral devices,
plus system and TURBOchannel option modules; each device has
its own cabling requirements. A simple label identifying each
cable in your multimedia configuration will make any future
move or equipment change easier.

Installing the Sound and Motion J300 Option Module

Overview The Sound and Motion J300 option module may be installed in any available TURBOchannel slot in your system. TURBOchannel modules are installed in all Alpha AXP systems in a similar way.

Instructions for DEC 3000 Systems The DEC 3000 Models 400/400S, 500/500S/500X, 600/600S, and 800/800S AXP systems connect a TURBOchannel module to the system board using on-board plastic support posts. See your system documentation for illustrations of these posts and instructions for installing a TURBOchannel module.

Special Instructions for Model 300 System

If you have a DEC 3000 Model 300 system, you must use the aluminum spacers supplied in your Sound and Motion J300 parts kit. Locate the two Phillips mounting screws and the two spacers in the parts kit. Then, follow these steps:

1. Place the two spacers (❶ in Figure 2) between the two Sound and Motion J300 modules (note the two unused holes at back corners of the module).

2. Insert one screw (❷ in Figure 2) into each spacer hole, and turn the screw to the right.

3. Install the module into the system unit.

Figure 2 Preparing Option for Model 300 AXP System
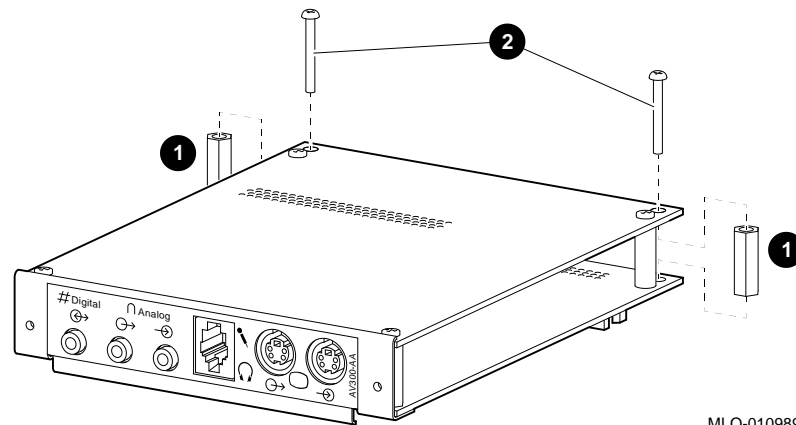
MLO-010989

Installing and Removing Modules

Refer to the documentation that shipped with your DEC 3000 AXP system for instructions on installing and removing TURBOchannel option modules. Your system documentation should explain how to:

1. Shut down the system software.

2. Turn off the system.

3. Remove the system cables.

4. Remove the system unit cover.

5. Attach the antistatic wrist strap.

6. Remove the TURBOchannel option slot cover.

7. Install the TURBOchannel option module.

8. Secure the TURBOchannel option module to the system.

9. Replace the system unit cover.

10. Connect the system cables.

11. Turn on your system.

12. Run console mode diagnostics; refer to the section Verifying the Installation .

Connecting Cables to the Module

Bulkhead Connectors

The connectors, shown in Figure 3, are identified as follows:

❶ Digital audio in/out connector—3.5 mm (1/8 in) stereo mini-jack

❷ Analog audio out connector—3.5 mm (1/8 in) stereo mini-jack

❸ Analog audio in connector—3.5 mm (1/8 in) stereo mini-jack

❹ Microphone/speaker/headset/handset connector—4-pin MJ connector

❺ Video out connector—4-pin mini-DIN S-video connector

❻ Video in connector—4-pin mini-DIN S-video connector

Figure 3   Identifying the Connectors
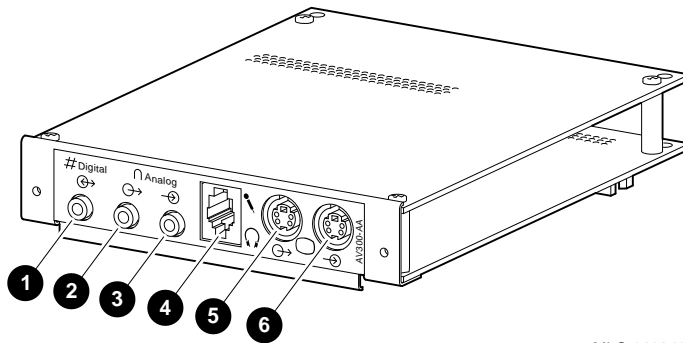
MLO-010849

Cables   If you have cables that do not match the cable connectors on
                               your new Sound and Motion J300 option module, you may need
                               to use an 1/8 inch to 1/4 inch phone adapter (customer supplied).

Video Display   Table 2 identifies the cables and adapters you use when you
- TV or VCR   connect your Sound and Motion J300 option module to a video
Input   display, TV or VCR input mode.

**Table 2   Using Cables and Adapters Correctly with Video
             Displays**

If the video display has...	Follow these instructions...	To J300 Video Output
A BNC connector	Connect a BNC-to-BNC cable (customer supplied) to a BNC-to-RCA adapter (parts kit) to channel 1 of the S-video to RCA adapter (parts kit)	❺ in Figure 3
An RCA connector	Connect an RCA-to-RCA cable (customer supplied) to channel 1 of the S-video to RCA adapter (parts kit)	❺ in Figure 3
An S-video 4-pin mini-DIN connector	Connect an S-video to S-video cable (customer supplied)	❺ in Figure 3

**Video Disc
Player or VCR
Output**

Table 3 identifies the cables and adapters you use when you
connect your Sound and Motion J300 option module to a video
disc player, TV tuner or VCR output.

**Table 3   Using Cables and Adapters Correctly with Video
Output Devices**

If the video disc player has...	Follow these instructions...	To J300 Video Input
A BNC connector	Connect a BNC-to-BNC cable (customer supplied) to a BNC-to-RCA adapter (parts kit) to channel 1 of the S-video to RCA adapter (parts kit)	❻ in Figure 3
An RCA connector	Connect an RCA-to-RCA cable (customer supplied) to channel 1 of the S-video to RCA adapter (parts kit)	❻ in Figure 3
An S-video 4-pin mini-DIN connector	Connect an S-video to S-video cable (customer supplied)	❻ in Figure 3

Analog Audio Player

Table 4 identifies the cables and adapters you use when you connect your Sound and Motion J300 option module to an analog audio player.

Table 4 Using Cables and Adapters Correctly with Analog Audio Players

If the analog audio player has...	Follow these instructions...	To J300 Audio Output
An RCA connector	Connect an RCA-to-RCA cable (customer supplied) to a phone plug-to-RCA cable (parts kit)	❷ in Figure 3
A 1/8-inch phone connector	Connect a 1/8-inch to 1/8-inch phone cable (customer supplied)	❷ in Figure 3
A 1/4-inch phone connector	Connect a 1/4-inch phone to 1/8-inch phone adapter (customer supplied) to a 1/8-inch to 1/8-inch cable (customer supplied)	❷ in Figure 3

Analog Audio Recorder

Table 5 identifies the cables and adapters you use when you connect your Sound and Motion J300 option module to an analog audio recorder.

Table 5 Using Cables and Adapters Correctly for Analog Audio Recorders

If the audio recorder has...	Follow these instructions...	To J300 Audio Input
An RCA connector	Connect an RCA-to-RCA cable (customer supplied) to phone plug-to-RCA cable (parts kit)	❸ in Figure 3
A 1/8-inch phone connector	Connect a 1/8-inch to 1/8-inch phone cable (customer supplied)	❸ in Figure 3

Table 5 (Cont.) Using Cables and Adapters Correctly for Analog Audio Recorders

If the audio recorder has...	Follow these instructions...	To J300 Audio Input
A 1/4-inch phone connector	Connect a 1/4-inch phone to 1/8-inch phone adapter (customer supplied) to a 1/8-inch to 1/8-inch cable (customer supplied)	❸ in Figure 3

Audio Headset   Table 6 identifies the cables you use when you connect a headset to your Sound and Motion J300 option module.

Table 6   Using Headset Cables Correctly

If the headset has...	Follow these instructions...	To J300 Mic/Speaker Jack
One 4-pin MJ connector	Plug the connector directly in	❹ in Figure 3
Two 1/8-inch phone plugs	Connect the microphone connector to the audio adapter cable (at microphone icon), connect the headset connector to the audio adapter cable (at headset icon), connect the MJ connector on the audio adapter cable	❹ in Figure 3

Digital Audio Devices

Table 7 identifies the cables and adapters you use when you connect your Sound and Motion J300 option module to a digital audio device.

Table 7   Using Cables and Adapters Correctly for Digital Audio Input/Output Devices

If the audio device has...	Follow these instructions...	To J300 Digital Audio Input/Output
An RCA audio-out connector	Connect an RCA-to-RCA cable (customer supplied) to red side of phone plug-to-RCA cable (parts kit)	❶ in Figure 3
An RCA audio-in connector	Connect an RCA-to-RCA cable (customer supplied) to white side of phone plug-to-RCA cable (parts kit)	❶ in Figure 3

Verifying the Installation

Display Configuration Data

To check for proper installation of the Sound and Motion J300 option module, enter the show config command at the console prompt (>>>) to display configuration data about the option module.

The command format is:

```
>>>sh config Return
```

Configuration Display

Figure 4 Correct Configuration Display

```
DEC 3000 - M800
Digital Equipment Corporation
     VPP PAL X5.41-82000101 - Built on 10-July-1993 00:00:00.00

TCINFO      DEVNAM       DEVSTAT
------      ------       -------
               CPU       OK KN17-AA-V3.9-SO86-IO62-DECchip 21064 P3.0
              ASIC       OK
               MEM       OK
8
7
               NVR       OK
               SCC       OK
                NI       OK
              ISDN       OK
6
              SCSI       OK
5-AV300-AA    TC5

>>>
```

The display identifies your module:

- By ID (or part) number (AV300-AA)

- By the number of the system unit slot that contains the module (slot 5)

19

Alternatively you can test the module as follows:

```
>>> t tc5 cnfg Return
```

The following appears:

```
DEC AV300-AA V1.0 (Sound & Motion J300)
Option has Rev B Video Encoder Chip
>>>
```

Identifying the TURBOchannel Slot

A line that begins with 5, 4, 3, 2, 1, or 0, and contains the AV300-AA identifier, indicates the presence of the Sound and Motion J300 option module in the numbered TURBOchannel slot. A slot that does not contain an option module does not appear in the configuration display.

_____ **Note** _____

Systems configured for autoboot do not display a console prompt. Console commands cannot be used with autoboot configured.

_____

Diagnosing and Solving Problems

Overview

Problems with the Sound and Motion J300 option module can be diagnosed using these methods:

- ROM-based diagnostics
- Operating system-based diagnostics

ROM Diagnostics

ROM-based diagnostics run every time you turn on or reset your system. Emulator scripts verify that your Sound and Motion J300 option module in a specified TURBOchannel slot is functioning properly. In addition to diagnostic testing, the scripts perform other tasks, such as:

- Initialize the option module
- Display the configuration as shown in Figure 4
- Run the console on a TURBOchannel option module

Operating System Diagnostics

Operating system-based diagnostics use the Sound and Motion J300 drivers and enabling software to test complex functions such as: compression, decompression, dithering, video-out, video-in, and audio. Operating system diagnostics are only available to self-maintenance customers and the Digital Multivendor Customer Services representative. See Appendix A for additional information.

**Testing a
Specific Module**

You can perform specific testing of a module, by entering the following command at the console prompt (>>>):

```
t[est] tc#  Return
```

- `tc` is the device name

- `#` specifies the slot number 0, 1, 2, and so on.

The following command example executes default test scripts on the option module installed in TURBOchannel slot 1.

```
t[est] tc1  Return
```

Additionally, you can list the default test scripts on the option module installed in TURBOchannel slot 4 by entering the following command example. See Appendix A for a brief description of each test in a script.

```
t[est] tc4 ?  Return
```

Additional Tests

The following tests may help in diagnosing problems:

- Quick Power-Up Test

  The `pst-q` power-up test is a quick test (about 5 seconds long) that checks the functionality of the module. Use this test after you turn on your system for the first time, or when your system is reset (operating system is not running).

  When the power-up test has completed successfully, the console prompt (`>>>`) appears on the screen.

  Systems configured for autoboot do not display a console prompt. Refer to your systems documentation for information on how to change the `set boot_reset` command.

  The `pst-q` script contains the following tests:

  ```
  t $ [#]/rom
  t $ [#]/Dregs
  t $ [#]/int
  t $ [#]/Cregs
  t $ [#]/Tbl_ram
  t $ [#]/Dram
  t $ [#]/Sram
  t $ [#]/Areg
  t $ [#]/iic
  t $ [#]/Venc
  t $ [#]/dio
  t $ [#]/aio
  ```

- Thorough Power-Up Test

  The `pst-t` power-up test is a longer (about one minute long) and more complete test that verifies the functionality of the module. When the power-up test has completed successfully, the console prompt (`>>>`) appears on the screen.

  The `pst-t` script contains the following tests:

  ```
  t $ [#]/rom
  t $ [#]/Dregs
  t $ [#]/int
  t $ [#]/Cregs
  t $ [#]/Tbl_ram
  t $ [#]/Hram
  t $ [#]/Dram
  t $ [#]/Sram
  t $ [#]/Areg
  t $ [#]/iic
  t $ [#]/Venc
  t $ [#]/dio
  t $ [#]/aio
  ```

Diagnostic Error Messages

If either the `pst-q` or the `pst-t` tests do not complete successfully, error messages appear. Error messages, when generated, have the following form:

```
? T-ERR-ASIC - TC ERROR address=%x data read=%x data exp=%x
```

Each field in the above error message example is explained as follows:

- address = the indirect address of the failing register

- data read = data read

- data exp = data exp

Equipment Return and Warranty Information

If the diagnostic tests detect an error, use either of the following methods for help:

- If you have a service contract or the warranty is still in effect, then report the problem to your local Digital service center.

- If you purchased your option module at list price, then Digital provides FRU (Field Replaceable Unit) return-to-Digital support for one year.

3

Creating a Multimedia System

Overview

Chapter

This chapter provides information about connecting multimedia peripherals to your system:

- The configuration for a videoconferencing system is described in the section entitled Creating Your System.

- The steps to cable an example multimedia system using the Sound and Motion J300 option modules are listed in Table 8, and shown in Figure 5.

**Cabling A
Multimedia
System**

Table 8 identifies the cable connections you make when you set
up the example multimedia system shown in Figure 5.

Table 8   Cable Connections for a Multimedia System

Connect the...	To the...
Amplifier output ❶	J300 Analog audio-in connector
Amplifier input ❷	J300 Analog audio-out connector
Speakers ❸	Amplifier speaker jacks
Digital audio tape (DAT) ❹	J300 Digital audio input/output connector
Headset ❺	J300 Microphone/speaker /headset/handset connector
Video cassette recorder (VCR) ❻	Video out connector
Video camera/camcorder ❼	Video in connector
Camera, amplifier, DAT player, VCR, and power cords ❽	Power strip
System unit power cord	Power source
Monitor	System unit
Monitor power cable	Auxiliary power source on system unit
Keyboard cable	Connector block
Mouse	Connector block
Connector block	Keyboard/mouse connector on system unit

Figure 5 Multimedia System
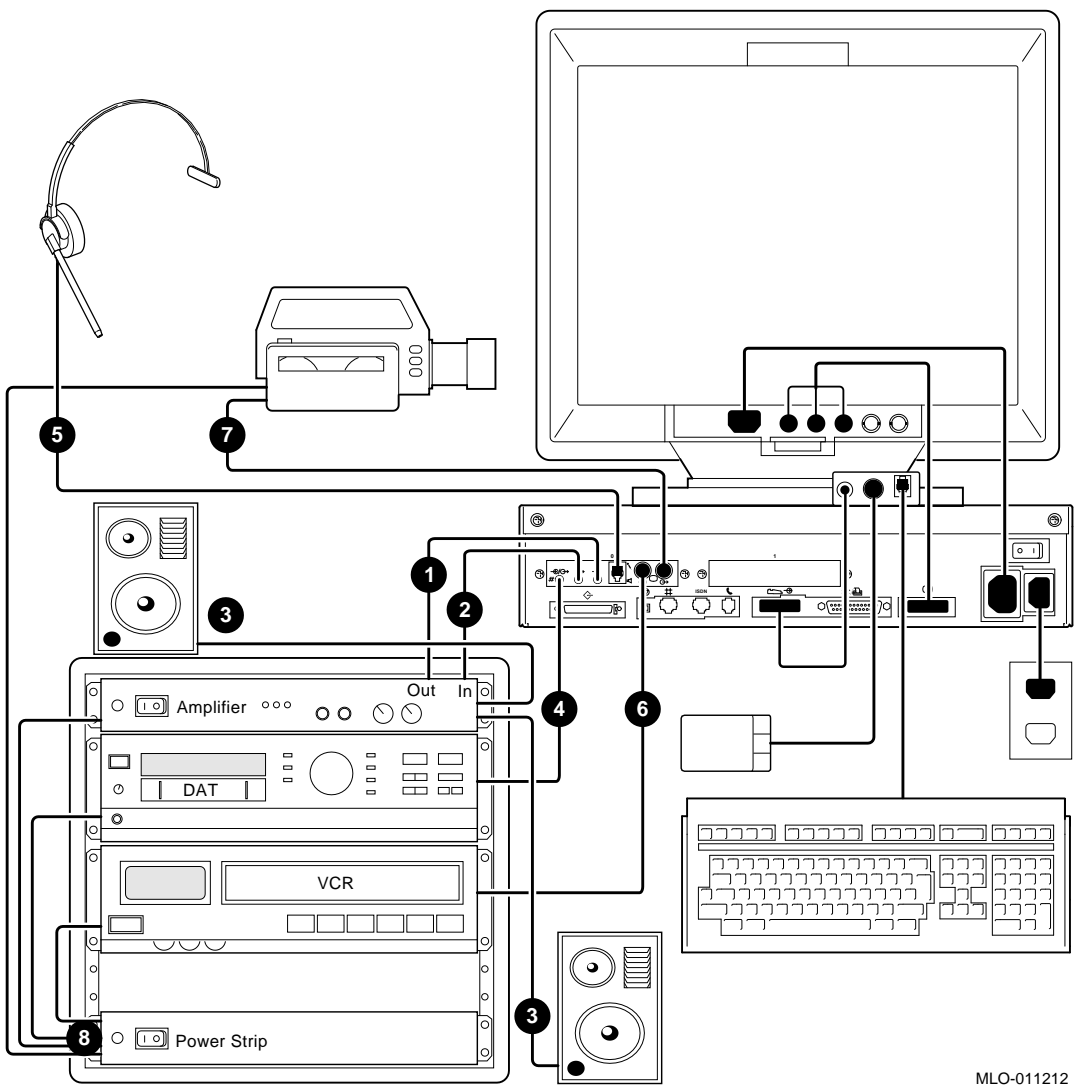
MLO-011212

Creating Your System

You can create your own multimedia system with hardware that lets you store, present, and communicate information. When you add software and peripheral devices, you have the potential to create and use multimedia training, education, presentation, communications, and conferencing applications.

Your multimedia application may only require three or four peripherals and one storage device. For example, a Digital videoconferencing application called DECspin, requires a video camera, an audio input/output device (headset), an internal 1+ gigabyte hard disk, and an RRD42 compact disk drive to load software. The multimedia configuration might look like the following picture.
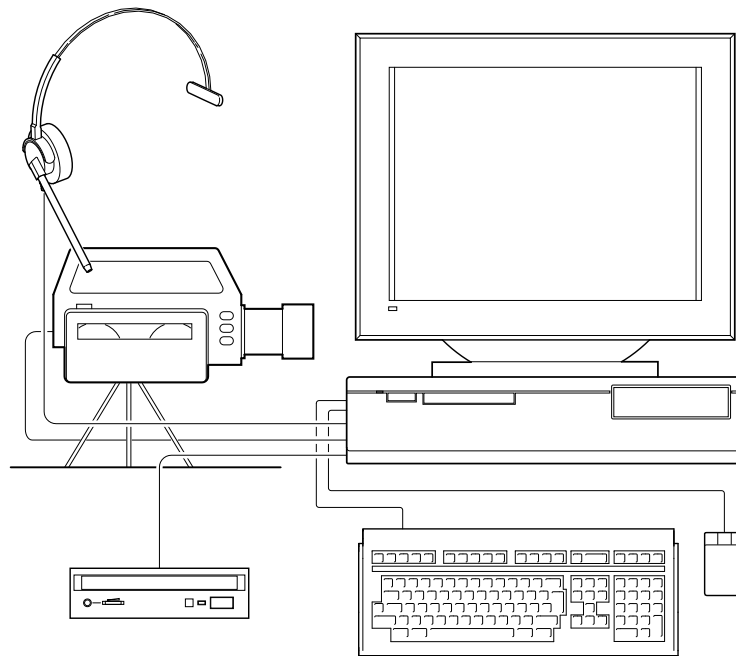
MLO-011211

A

For Digital Multivendor Customer Services Representatives

Overview

Appendix

This appendix provides a list of field replaceable units (FRUs), describes the audio and video operating system diagnostics, and lists the diagnostic test scripts.

Additionally, you use the same audio and video ROM-based diagnostics that the customer uses to verify the functionality of the module.

Ordering FRUs

Use the information in Table 9 to order field replaceable units for the customer.

Table 9   Field Replaceable Units

Field Replaceable Unit	Part Number
BNC–to–RCA Adapters (2)	12–41420–01
S-video to two-RCA adapter (2)	12–41133–01
3.5 mm (1/8 in) Stereo phone-plug to dual RCA-jack cables (3)	17–03858–01
J300 Option module	70–30284–01
4-Position MJ to mono mic/stereo-headphone	17–03345–01
Antistatic wrist strap	12–36175–01

Operating System Diagnostics

Running Diagnostics

The Sound and Motion J300 diagnostics test different parts of the hardware. They do not require an operator to determine the pass/fail outcome and can be invoked independently.

The diagnostics are invoked at the operating system prompt $; help is displayed when you use the following command:

```
$jv2test -h
```

The display contains the following information:

```
$jvtest -[flags] [n] tests per script

usage:  ./jv2test [flags] [n] tests or script
flags:  -v = verbose mode (print names of tests/subtests)
        -D = debug info, prints a lot more than -v
        -c = complete the test, do not stop on failure
        -n = Silent mode, nothing will be output, no error messages
        -l [n] = loop on selected tests for n iteration
        -S = execute script whose name follows
            (cannot mix test names and script names in same command)
        -L = List Tests in a given Script
        -dxx = duration for tests that display pictures
        -Jmm = Specify JV2 mm in the System for testing
        -f = log error message to 'jv2test_err.log'
            (if exist, it appends to the existing log file)
        -h = help, What would life be without this option!!
        -i = runs test in Interactive Mode
            (using more than one flag, -J0cvf)
n:      loop count, with -l option, = 0, loop on forever
tests:  rst  - Reset JV2 Option
        cnfg - JV2 configuration
        Jreg - JPEG Board Registers Test
        DDD  - Dcube Controller Tests
        fls  - Frame Store Ctrl Vid Timing blk
        vil  - Video Internal Loopback Test
        vx1  - Video Ext.Loopback Test - Input1
        vx2  - Video Ext.Loopback Test - Input2
        vxs  - Video Ext.Loopback Test - SVideo
        vxl  - Video Ext.Loopback Test I/P 1&2
        vin  - Display DITHERED Image
        vot  - Generate Patterns at the Output
        dcd  - Display COMPRESSED/DECOMP Image
        cdc  - Compress, Decompress & Compare
        vrs  - Video RAM Serial Port test
```

```
        AUD  - Audio Subsystem Tests
        RAM  - DSP/Scratch RAM test - from Host
        ram  - DSP Ram test         - from DSP
        dma  - Audio DMA test
        Ddma - Detailed Audio DMA test
        dit  - Audio/Video DMA Interaction test
        DIO  - Audio Digital I/O Subsystem Test
        AIO  - Analog Audio Subsystem Test
        Areg - Audio CSR Test
        Hax  - Headset External Loopback Test
        Aax  - ACodec Ext-Lpb Test (CS4215)
        Aai  - ACodec Int-Lpb(44,48,Analog)Test
        asin - Analog Sinewave Generator
        aad  - Analog Audio 'Monitor' Demo
        kau  - KGM Test, Digital Audio I/O
        KAU  - KGM Test, AES/EBU Test
        icd  - Audio prog I/O + 'cdc' test
        dram - Dump DSP RAM
        kvo  - KGM Test, VideoIn, VideoOut
scripts:
        pwslt - PowerUp Self Test Script
        svrce - Test Script Using External Loopback Cables
        manuf - Test Script Used in JV2 Manufacturing
```

───────────────── **Note** ─────────────────

Do not mix test and script names in the same command.

If an error log already exists, the new log file is appended to the existing log file.

Video Tests   Table 10 lists and describes the operating system-based video tests.

Table 10   Operating System-based Video Tests

Test Name	What It Does	Description
rst	Resets the J300 option module	Tests the J300 option module at a known state, and then configures the IIC bus.
cnfg	Checks the J300 configuration	Reads the header from the flash ROM and displays the header on the screen. Checks the unique header patterns in the ROM. Verifies that the video board is attached to the JPEG board and flags an error. Displays the revision level of the video encoder chip on the screen.
ROM	Checks ROM interface	Checks the ROM for a unique pattern to see if the video board is properly connected to the JPEG board.
Jreg	Tests registers on JPEG module	Toggles the read/write registers on the Dcube and Ccube chips. The -d option names the registers where the data read appears. The -v option displays the name of the chip and type of test being performed.
Cregs	Checks the Ccube registers	Checks the Ccube registers for initial values as well as for read/write access.
int	Checks the interrupt controller	Checks the operation of the interrupt controller in the Dcube chip using diagnostics.

(continued on next page)

Table 10 (Cont.)   Operating System-based Video Tests

Test Name	What It Does	Description
DDD	Diagnoses the Dcube ASIC	**Register test** - checks initial values of read and write registers
		Interrupt controller test - checks the ASIC interrupt controller
		Timer block test - checks to see if the timer is operating correctly.
cdc	Compresses, decompresses and compares images	Displays a test pattern, compresses it, stores it in the frame store, then decompresses and reads it back into memory. The decompressed pattern is compared to the original pattern. The image is not an exact reproduction of the original.
flsvt	Tests frame store control block and video timing block	Tests video-in and video-out. Tests the IIC controller and Video-out encoder.
vil	Tests video using internal (digital) loopback	The video board contains a mux that routes the output to the input to check the video-out and video-in paths.
vxl	Tests video using an external loopback	Using an external S-video to S-video cable, you can test the video-in and video-out paths on input1 and input2.
vx1	Tests video using an external loopback—Input1	Using an external S-video to S-video cable, you can test the video-in and video-out paths on input1.
vx2	Tests video using an external loopback—Input2	Using an external S-video to S-video cable, you can test the video-in and video-out paths on input2.

Table 10 (Cont.)   Operating System-based Video Tests

Test Name	What It Does	Description
vxs	Tests video using an external loopback in S-video mode	Using an external S-video to S-video cable, you can test the video-in and video-out paths using S-video format.
dcd	Tests video compression, decompression and display	Opens a window, compresses an image, decompresses the image and displays the image. The test is interactive, prompts for input selection, display duration, and so on.
vin	Displays a dithered image	Opens a window, dithers and displays the image. The test is interactive, prompts for input selection, display duration, and so on.
vot	Generates output patterns	Requires a monitor to be connected to the video output connector (see ❺ in Figure 3.) This test creates a pattern in the frame store and outputs the pattern to the monitor. This test exercises the video-out circuitry.
vrs	Tests the video RAM serial port	Loads a pattern, transfers the contents of one bank to the other bank, and verifies that the data is the same in both banks.
iic	Checks the IIC bus	Checks the interface to and the operation of the IIC bus.
Venc	Checks the interface to the video encoder chip	Tests the registers inside the video encoder chip for read/write access.

Audio Tests   Table 11 lists and describes the operating system-based audio
tests.

Table 11   Operating System-based Audio Tests

Test Name	What It Does	Description
RAM	Tests the DSP and scratch RAM from host	–
ram	Tests the DSP RAM from the DSP buffer	–
Sram	Checks the scratch RAM	Runs the RAM test on scratch RAM locations.
Hram	Checks the DSP RAM from the host side	Checks the interface to the DSP RAM from the host side.
Dram	Checks the DSP RAM from the DSP side	Checks the interface to the DSP RAM from the host side.
Tbl_ram	Checks FIFO and Huff table locations	Checks the interface and contents of the following: FIFO memory Huffman Table YAC Huffman Table YDC Huffman Table CAC Huffman Table DCD
dma	Tests audio DMA controller	Checks DMA transfer of data from the DSP memory to the system memory, and from system memory to DSP memory.
Ddma	A detailed test of the DMA interface	Tests the DMA and associated logic more extensively. Uses combinations of packed and unpacked data, with sign and without sign extension, with long and short data during DMA transfer.

Table 11 (Cont.)   Operating System-based Audio Tests

Test Name	What It Does	Description
dump_ Dram utility	Examines the content of the DSP RAM locations	Dumps the contents of the DSP RAM to the screen.
dit	Tests DMA interaction	Checks the arbitration between the audio and video DMA logic. Checks to see if both DMA controllers are started simultaneously.
icd	Tests audio DMA interaction with JPEG operations	Ensures that audio operation does not interfere with video operation. Functionally, the programmed I/O access to the DSP memory is overlapped with the JPEG compression and decompression operation.
dio	Tests the digital audio transceiver I/O subsystem	Checks the ability of the DSP 56401 to produce *clock* and *fsync* pulse.
AIO	Tests the analog audio subsystem	Checks the registers of the analog I/O chip by writing and reading back a pattern, as well as the crystal oscillator associated with the analog audio subsystem. Determines the ratio between the DSP clock and the analog Codec sample timers for different sampling frequencies.
Areg	Tests the audio control-status register	Tests the audio CSR in the Dcube chip. All read/write bits are tested for "stuck-at" fault by running a counter pattern.
Aai	Tests the analog audio controller using internal loopback	Checks the analog Codec using an internal loopback capability provided in the chip.

(continued on next page)

Table 11 (Cont.)   Operating System-based Audio Tests

Test Name	What It Does	Description
Aax	Tests the analog audio controller chip using an external loopback	Similar to aai test, but requires external cabling between the left channel of the analog output to the left channel of the analog input, and cabling between the right channel of the analog output to the right channel of the analog input.

Test Scripts

Description

A test script is a list of tests that are run in the order in which the script is created. Test scripts can be executed at the command line.

The `pwslt` script is a powerup self-test script that does not require external loopbacks be attached. The `svrce` script requires external loopbacks be connected. The two external loopback cables required to run the `svrce` test script are:

- An S-video to S-video cable connecting video-out to video-in connectors.

- A cable connecting the analog audio-out left channel to the analog audio-in left channel; a second cable connecting the analog audio-out right channel to the analog audio-in right channel.

**Powerup
Self-test Script**

The `pwslt` test script includes the follow subtests:

rst	ram
cnfg	dma
Jreg	Ddma
DDD	dit
fls	DIO
cdc	AIO
vrs	Areg
vil	Aai
AUD	icd
RAM	

**Service Test
Script**

The `svrce` test script includes the following subtests:

rst	AUD
cnfg	RAM
Jreg	ram
DDD	dma
fls	Ddma
vil	dit
vx1	DIO
vx2	AIO
vxs	Areg
vxl	Aax
cdc	Aai
vrs	icd

B

Hardware Specifications

Overview

Appendix   This appendix provides the hardware specification for the Sound and Motion J300 option module, as follows:

- Sound and Motion J300 Environmental Specifications
- Input/Output Electrical Characteristics

Environmental Specifications

Overview
Table 12 and Table 13 provide information about the environmental conditions in which the Sound and Motion J300 option module can operate.

Operating Conditions
The term "operating conditions" refers to a Sound and Motion J300 option module in an Alpha AXP system that is plugged in, turned on, and running.

Table 12 Operating Conditions

Temperature range	10°C (50°F) to 40°C (104°F)[1]
Temperature change rate	11°C/hr (20°F/hr) maximum
Relative humidity	5% to 95% at 66°C noncondensing
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)

[1]Temperature range varies between systems. See your system documentation for additional information.

Nonoperating Conditions
The term "nonoperating conditions" refers to a Sound and Motion J300 option module plugged into an Alpha AXP system that is plugged in, not turned on, and not running.

Table 13 Nonoperating Conditions

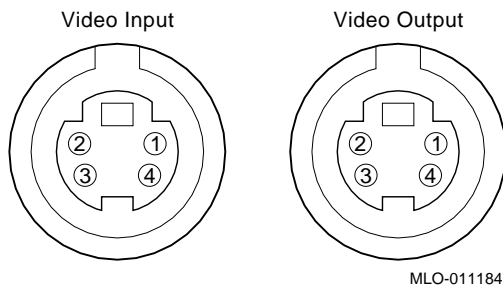|	
Temperature range	-40°C (-40°F) to 66°C (151°F)
Maximum wet bulb temperature	46°C (115°F)

Input/Output Electrical Characteristics

Video Input/Output Characteristics

The Sound and Motion J300 input and output connectors are single 4-pin DIN connectors. Figure 6 shows the connector pin placement.

Figure 6   Video I/O Connector Pin Diagram

Video Input   Video Output

MLO-011184

Both connectors can be software configured in either S-video or composite mode. Table 14 identifies the electrical characteristics of each pin shown in Figure 6.

Table 14   Video Input/output Pin Assignments

1	GND
2	GND
3	Luma I/O (S-video) Input 0 (composite) Output (composite)
4	Chroma I/O (S-video) Input 1 (composite) Output (composite)

Video Input Characteristics

Video input signals conform to either NTSC, PAL, or SECAM specifications for timing and levels. Table 15 lists the video input characteristics.

Table 15   Video Input Characteristics

Impedance	75 ohms
Input voltage	1 Vpp (nominal)
Polarity	White positive
Coupling	DC coupled

Video Output Characteristics

Table 16 lists the video output connector characteristics.

Table 16   Video Output Characteristics

Impedance	75 ohms
Output voltage	1 Vpp (nominal) into 75 ohms
Polarity	White positive
Coupling	DC coupled

Audio Connector Characteristics

The line level stereo audio and digital audio I/O is accomplished with three, 3.5 mm stereo jacks. Table 17 lists the connector pin assignments.

Table 17   Audio Connector Pin Assignments

	Analog Audio In	Analog Audio Out	Digital Audio I/O
Tip	Left channel	Left channel	Audio out
Ring	Right channel	Right channel	Audio in
Sleeve	Common	Common	Common

Headset Connector Pin Assignments

The headset pin assignments are shown next.

1 2 3 4
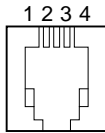
Pin 1 - Common
Pin 2 - Headphone Out+
Pin 3 - Headphone Out
Pin 4 - Microphone In

MLO-011279

Audio Analog Line In

The audio analog line in characteristics for each channel are described in Table 18.

Table 18 Audio Analog Line In Characteristics (Each Channel)

Unbalanced	—
Input impedance	10 000 ohms
Input level	1V RMS maximum
Frequency response	20 Hz to 20 000 Hz (20K Hz) with sampling rate of 44.1K or 48K
Signal to noise+distortion	80 dB
Channel separation	80 dB
Plug type	3.5 mm (1/8 in) stereo mini-plug

Analog Audio Line Out

The analog audio line out characteristics for each channel are described in Table 19.

Table 19 Analog Audio Line Out Characteristics (Each Channel)

Unbalanced	—
Load impedance levels	>8K ohms to maximize audio fidelity
Output level	1V RMS maximum
Frequency response	20 Hz to 20 000 Hz (20K Hz) with sampling rate of 44.1K or 48K
Signal to noise+distortion	80 dB
Channel separation	80 dB
Plug type	3.5 mm (1/8 in) stereo mini-plug

Digital Audio Input/Output Characteristics

Table 20 lists the digital audio input characteristics. Table 21 lists the digital audio output characteristics.

Table 20 Digital Input

AC coupled	–
Input impedance	75 ohms to ground
Input signal level	350 millivolts minimum
Plug type	RCA phono-jack (use cable ❹ in Figure 1)

Table 21   Digital Output

AC coupled	–
Output impedance	75 ohms to ground
Output signal level	450 millivolts into ~75 ohms
Plug type	RCA phono-jack (use cable ❹ in Figure 1)

**Microphone/
Headphone I/O**

Table 22 lists the input/output characteristics of the microphone /headset connector.

Table 22   Microphone and Headphone I/O Characteristics

General Characteristics	
Unbalanced	—
Design	Accommodates telephone headsets, handsets with Electret microphones
Connections	Left channel only
Microphone Input	
Bias voltage	2 V for Electret microphones
Current	~500 microamps maximum
Headset Output	
Output load	>100 ohms to maximize audio fidelity
Output voltage	1 V RMS maximum

Glossary

This glossary contains concepts, terms, acronyms, and services associated with multimedia.

ASICs

Digital engineering custom-designed chip. The chip is designed by Digital but is manufactured by a vendor.

brightness

The amount of white (as compared to the amount of red, green, and blue) in a color. On a monitor, this translates into the amount of pure light in a color. For light sources and signals that transmit color, the brightness component is also called *luminance*.

chrominance

The color component of a composite signal or S-video signal. Chrominance also refers to the color component of any image, as opposed to its grayscale value or luminance. In terms of the NTSC color standard, chrominance contains the combined I and Q components of the signal.

composite video signal

Composite video signal types combine the YUV and sync signal on one wire. The video output on a VCR is a composite video signal, which can be received as video input by a television monitor.

A composite signal is a color display signal that transmits all necessary information (color, brightness, sync, and other information) together. The device that receives the composite signal must decode the various kinds of information in order to display an image. Mixing color and brightness information together, then separating the information in this

way, compromises the quality of the final image because some information is lost. Compare with *S-video signal*, which produces a higher-quality image than composite signals.

connector

A BNC-style connector that connects a section of ThinWire cable to a T-connector, to a system, or to a barrel connector.

contrast

The ratio between the maximum and minimum luminance (brightness) values of a display.

Direct Memory Access (DMA)

The ability to transfer data directly to or from memory without passing it through the central processor.

drawable

A collective term for windows and pixmaps, which can both be used as sources and destinations in graphics operations.

frame buffer

Memory used to store an array of graphic image data. Each element of the array corresponds to one or more pixels in a video display. See also *pixel*.

gigabyte (GB)

When referring to memory or secondary storage capacity, equal to 1,000 megabytes or 1,073,741,824 bytes.

hue

Hue represents the frequency of color and its position in the visible spectrum.

Joint Photographic Experts Group (JPEG)

An ISO method for still image compression. The flexibility of JPEG allows the user to achieve visually lossless results, while reducing the amount of data to be stored. The image compression is a function of a chosen quality factor, the amount of high-frequency information contained in an image and the viewer's tolerance to the resulting visual loss. Gray scale is less compressible due to the absence of the chrominance components

and the dominance of luminance which is more difficult to compress.

luminance

The brightness or grayscale component of an S-video or composite signal. As the chrominance value gives an S-video signal its hue, luminance defines its brightness. In terms of the NTSC color standard, luminance contains the Y signal, while chrominance contains the combined I and Q signals. Also used interchangeably with the term *brightness*.

multimedia

A set of technologies that allow for the capture, manipulation, presentation, and integration of information involving data types such as text, graphics, and images, as well as animation, full-motion video, and high-quality audio.

NTSC

A color-encoding and decoding system for the transmission of video signals, 640 lines wide by 480 lines high at 30 Hz—adopted by the National Television System Committee in 1953 and was the first monochrome-compatible, simultaneous color system used for public broadcasting. It was adopted by the Federal Communications Commission for use in the United States, and is also used in Canada, Japan, and Mexico. Compare with *PAL* and *SECAM*.

Phase Alternation Line (PAL)

A color-encoding and decoding system for the transmission of video signals, 625 lines per frame at 50 Hz, used in most European countries. Compare with *NTSC* and *SECAM*.

pixel

A picture element that is the basic unit of a graphic display. A location on the monitor screen that can be selectively turned on or off. The more pixels to a screen unit, the higher the picture resolution.

raster

The electron beam that scans the image onto a picture tube. Raster images are generated with an intensity-controlled, line-by-line sweep of the electron beam across the screen. Television sets use raster displays.

read-only memory (ROM)

Memory that cannot be modified. The system can use (read) the data in ROM but cannot change it.

saturation

The richness of a color, as determined by the amount of white in the color.

scaling

Enlarging or reducing all or part of a display image by multiplying its coordinates by a constant value.

SECAM

See *Systeme Electronique Couleur Avec Memoire*.

Systeme Electronique Couleur Avec Memoire (SECAM)

A color-encoding and decoding system for the transmission of video signals, 625 lines per frame at 50 Hz. The SECAM system is used in France and the USSR. Compare with *NTSC* and *PAL*.

S-video signal

A separate video signal that carries the luminance (brightness) information and chrominance (color) information separately. The S-video signal is the same as the composite video signal, except that the Y signal (intensity) is on a separate wire from the U-V signal. Some high-end VCRs have an S-video output for connection to high-end television monitors. Contrast with *composite* and *RGB*.

video signal

A signal generated by a television signal, VCR, camcorder or laser disc player.

Index