Kelvin MPEG
User's Manual

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INTRODUCTION

Kelvin MPEG™   is a powerful Windows accelerator that combines 64-bit graphics with MPEG playback, all on one card! If you currently own a sound card, Kelvin MPEG will add full-screen MPEG video playback with audio capability to your computer.

MPEG (Moving Picture Experts Group) is a full-motion video compression technology that allows you to play back television-quality video. It records changes between frames of data. Rather than storing information about each individual frame, only the changed data is stored during recording and reassembled during playback.

Kelvin MPEG supports full-screen, 30 frames per second video playback in 24-bit color and resolutions up to 1280x1024. Support for the VESA standard is integrated into the Kelvin MPEG BIOS, and refresh rates exceed the VESA standard of 72Hz.

In addition, Kelvin MPEG comes with a comprehensive range of software enhancements and user-friendly utilities. The Switch-on-the-fly Magnify feature can instantly magnify your screen to a different resolution. You can save energy with your monitor by using the Green PC Power Management and VESA Display Power Management Specification (DPMS) utility. Kelvin MPEG is also fully compatible with all MPEG CD-ROM applications for DOS and Windows.

Thank you for purchasing Kelvin MPEG. Care has been taken to ensure that it will provide you with years of trouble-free operation. We believe you will be pleased with your purchase.

ABOUT THIS MANUAL

This manual presumes that you are already familiar with your IBM PC compatible computer. While Kelvin MPEG has been designed to be easy to install, we recommend that you refer to your computer's reference manual when terminology or installation steps are unfamiliar to you. Each section is divided into short, easy-to-follow steps, to help you understand the installation and function of Kelvin MPEG.

Section 1: Hardware and Software

Whether you are a beginner or an experienced user, this section will give you important information on the proper hardware and software installation of Kelvin MPEG.

Section 2: Utilities

Here you are given information for a host of user-friendly utilities. These utilities include a Windows MCI driver for MPEG playback, a DOS driver for Kelvin MPEG programs, and a Demo CD that includes sample MPEG files.

Section 3: Kelvin MPEG CD Station

This section gives you information on the Kelvin MPEG CD Station utility, which allows you to play a variety of different CD formats.

Appendix A: Technical Information

If you are experiencing installation difficulties or require troubleshooting information, this section will give you checkpoints to look at to ensure that your Kelvin MPEG is operating properly. Appendix A also includes the technical specifications for Kelvin MPEG.

Appendix B: Green PC

Appendix B provides details on the Green PC feature.

Appendix C: CDi DigitalVideo/VideoCD Movies

This appendix describes how to play CDi and VideoCD movies using the Windows Media Player and the Kelvin MPEG VideoCD Movie Player for DOS.

This manual will familiarize you with the features, installation and use of your Kelvin MPEG. There are several symbols and conventions used throughout this manual which will help to draw your attention to a feature or to focus on important information:

When you see the Magnifying Glass, it means the text is referring to something you *should* take a closer look at before proceeding further.

When you see the Exclamation Mark, it gives important information on avoiding damage to property.

Common Names

DPMS   Display Power Management Signaling

ISA   Industry Standard Architecture

MPEG   Moving Picture Experts Group

PC   Refers to the family of IBM PC, PC/XT or PC/AT compatible computers

SVGA   Super VGA

VESA   Video Electronics Standards Association

VGA   Video Graphics Array

Section

1

INSTALLING KELVIN MPEG

Installation of the Kelvin MPEG is simplified by its innovative design, requiring no switches or jumpers to set. See Figure 1.1 for an overview of the Kelvin MPEG card.

A Demo CD with demonstration software is included to test the hardware setup from the DOS or Windows environment. The following steps will help you install Kelvin MPEG and connect it to your sound card or stereo speakers.

STATIC!
Before handling the Kelvin MPEG, be properly grounded by touching the power supply housing, or you may want to buy a Ground strap from your local computer store.

Hardware Installation

1. Turn off the power to your computer and disconnect all power cords and cables from the computer.

2. Remove the screws and slide the cover off.

3. Select a 32-bit VL-bus expansion slot for Kelvin MPEG.

4. Remove the rear slot cover bracket if it is present and keep the screw for future use.

5. Carefully hold Kelvin MPEG by the top edges and lower it into its expansion slot. Ensure that Kelvin MPEG seats firmly into the slot.

6. Secure it in place by fastening its metal bracket to the computer backplane.

7. Reconnect previously removed cables and power cords and replace the cover of the computer.

8. Connect your monitor cable to the 15-pin monitor connector on the Kelvin MPEG (see Figure 1.1).

For pin-out information on the 15-pin VGA connector, see Appendix A.
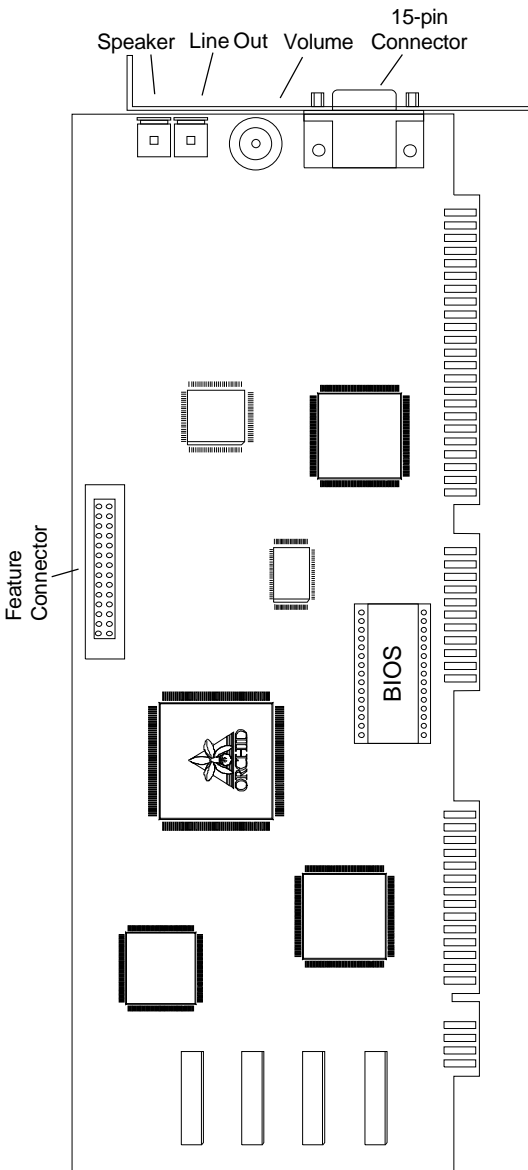
Figure 1.1: Kelvin MPEG Diagram

Connecting Kelvin MPEG to Your Sound Card

The Line Out port on the Kelvin MPEG provides standard non-amplified stereo audio signals for MPEG audio. We recommend connecting this to the auxiliary stereo Line In port of most sound cards. This allows you to control the MPEG audio volume through your sound card's mixer program under DOS or Windows.

1. Connect one end of the stereo cable provided to the Line Out port of the Kelvin MPEG card (see Figure 1.2).

2. Connect the other end of the cable to the Line In port of your sound card (see Figure 1.2). Refer to your sound card's manual for the location of the Line In port.
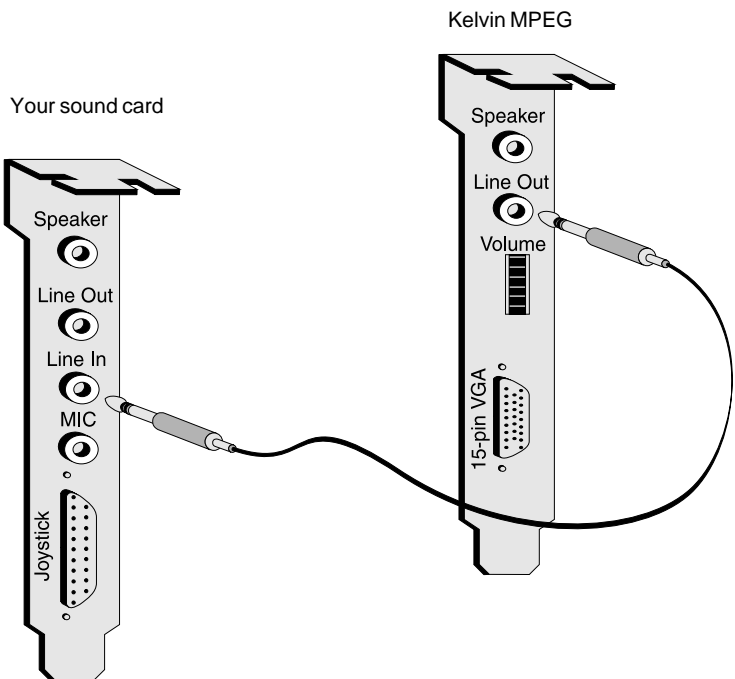
Figure 1.2: Connecting Kelvin MPEG

If your sound card has already been installed under Windows, make sure you know what interrupt address (IRQ) and DMA channels it uses. To find out which IRQ and DMA channels your sound card uses, refer to your sound card's documentation or open the Windows Control Panel and click on Drivers. Highlight the driver for your sound card and click on Setup. The IRQ and DMA information should be displayed. Write down this information and rerun the Kelvin MPEG Setup program to make sure there are no conflicts.

For help on avoiding address conflicts, see Appendix A.

Connecting Kelvin MPEG to Your Speakers

The Speaker port on the Kelvin MPEG provides standard amplified stereo audio signals for MPEG audio. We recommend connecting your non-amplified speakers to this port. You can control the MPEG audio volume with the Kelvin MPEG's volume control knob (refer to Figure 1.1)

1. Connect your speaker cable to the Speaker port of the Kelvin MPEG card (see Figure 1.1).

You can connect amplified speakers directly to the Line Out port and non-amplified speakers to the Speaker port.

SOFTWARE OVERVIEW

Kelvin MPEG comes with high resolution graphics drivers for popular software applications and a comprehensive range of utility programs. Kelvin MPEG provides register-level VGA mode compatibility. Software programs can be operated in this mode using drivers supplied by the software manufacturer. The high resolution drivers that come with Kelvin MPEG are:

Some software programs may already include software drivers for Kelvin MPEG. Check with the manufacturer for verification.

Windows 3.1	**Windows for Workgroups**
WordPerfect	**Lotus 1-2-3**
AutoCAD	

Other drivers are available through Orchid Technical Support, or may be downloaded from the Orchid Bulletin Board System (BBS) or CompuServe.

Software Installation

You can automatically install the Kelvin MPEG software drivers and utilities to your hard drive from the DOS command line. Follow the steps below:

1. Insert the Kelvin MPEG software disk into your floppy drive and type:

   A:**KMINSTAL** ⌈ Enter ← ⌋

Press any key to continue and the following menu appears:

All references to Windows apply to both Windows 3.1 and Windows for Workgroups.

```
┌─────────────────────────────────────────┐
│          Orchid  Technology              │
│    ┌─────────────────────────────┐       │
│    │      Microsoft  Windows      │       │
│    │      Technical  Support      │       │
│    └─────────────────────────────┘       │
└─↑↓=Move ↵=Select ESC=Previous Menu  F1=Help F3=Abort─┘
```
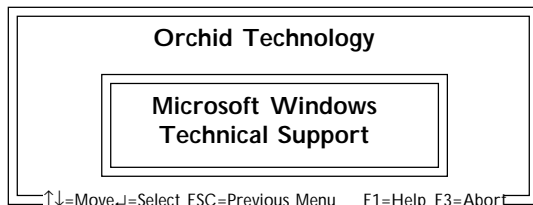
Figure 1.3: Main Menu Screen

2. Select your option and proceed through the installation program as prompted by the program.

3. You will be prompted to insert the Kelvin disk.

4. Once you return to the main menu, you can make another selection or quit the installation program.

The Kelvin MPEG software is now installed. Once you launch Windows, the Kelvin MPEG Setup icon is installed in the Orchid program group.

Network Considerations

The installation program offers standard and network installation options for Windows graphics drivers. When using Windows in a Novell (or compatible) network, select the Network Server Installation option.

The installer will ask for a directory name to install the drivers to. You must install the Kelvin MPEG Windows graphics drivers to the *shared* Windows directory on the network server. Once the drivers are installed on the network server, the Orchid icon appears in the Windows Control Panel on each workstation, for individual driver customization.

Testing the Configuration

Now that you have completed the Kelvin MPEG hardware and software installation, you can test the setup from Windows or DOS.

From Windows:

1. Start Microsoft Windows.

2. Insert the Kelvin MPEG Demo CD into your CD-ROM drive, if you have not already done so.

3. The Kelvin MPEG Setup program installs a group called Orchid. Open this group by double-clicking on the icon.

4. Start the Demo CD Player by double-clicking on the Demo CD Player icon.

5. Press the Business or Play button.

6. The Demo CD will start to play. You should see and hear the MPEG sequences. Press the Power button to exit.

From DOS:

1. Insert the Kelvin MPEG Demo CD into your CD-ROM drive.

2. At the DOS prompt, change to the \KMPEG subdirectory on your hard drive.

3. Type KMPGTEST and press ENTER.

4. You should see a preview of MPEG video and audio.

Section

2

WINDOWS UTILITIES

Orchid Control Panel

This menu is easy to use and allows you to configure your Windows video display driver, configure your monitor, enable the power management feature and center the display. The Orchid Control Panel can be accessed from the Orchid program group or the Windows Control Panel.

1. Double-click on the Orchid Control Panel icon and the following menu appears:

Figure 2.1: Display Setup Screen

2. Make your desired selections. Use this utility for any future changes to the Kelvin MPEG configuration.

Display Setup

Use this utility to select the resolution, text font size, colors for your display and to enable or disable the 8-bit feature connector for digital video. When certain combinations of resolutions and colors are chosen, the menu displays the Virtual Desktop or Switch on-the-fly Magnify

features *(see the following sections for more information on these features).*

1. From the Orchid Control Panel click on Display Setup.
   The following screen appears:

Display Setup

Screen Resolution

`640×480`

Font Size

`Small`

Number of Colors

`16`

Font Cache

● On ○ Off

Save   Cancel
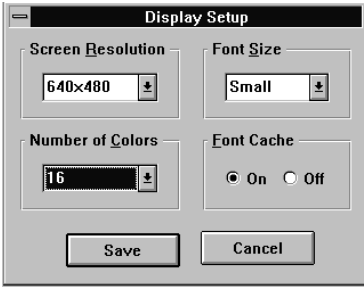
Figure 2.2: Virtual Screen

2. Make your desired selections and click on the Save
   button to store your new values.

Virtual Desktop Feature

You can use the Virtual desktop feature to create a larger
desktop workspace. With Virtual Desktop, your mouse
movement automatically pans the desktop to give you
access to any part of your document or window without
resizing or using scroll bars.

Virtual Screen is not available when MPEG is active.

It's an ideal solution for spreadsheet or desktop applica-
tions. A large area of display can be panned and viewed by
simply moving your mouse. Virtual Desktop doubles your
workspace by transforming your standard VGA monitor
into a virtual display with the maximum resolution avail-
able.

Virtual Desktop supports the 640x480x256 and
800x600x256 resolutions. When these are selected, the
Orchid Display Setup screen appears as follows:

Figure 2.3: Magnify Screen

To enable Virtual Desktop:

1. Click on the Virtual Desktop box to enable the option *(the selections are grayed out until you do so)*.

2. Choose a Pan Lock (Hot-Key) combination from the pull-down menu to lock the display (prevent it from moving when your mouse reaches the edge).

3. Choose a Desktop Size from the pull-down menu.

4. After making your selections click on the Save button to store your new values.

Switch-on-the-fly Magnify is not available when MPEG is active.

Switch-on-the-fly Magnify Feature

Switch-on-the-fly Magnify can enlarge a portion of your document to its maximum size. This is ideal when you need a closer view of your screen. It supports the 1024x768x256 resolution. When this resolution is selected, the Orchid Display Setup screen appears as follows:
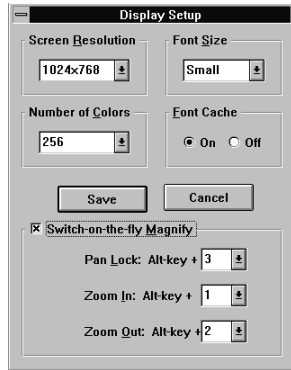
Figure 2.4: Monitor Setup Menu

You can also configure a Hot-Key sequence to activate the following options:

Pan Lock. Use the Pan Lock command to turn off panning, which prevents the Window from moving even if you move your mouse. You can unlock the Window by using the Hot-Key combination.

Zoom In. Use the Zoom In command to magnify a portion of your document.

Zoom Out. Use the Zoom Out command to see all of your document at one time.

To enable Switch-on-the-fly Magnify:

1. Click on the Switch-on-the-fly Magnify box to enable the option *(the selections are grayed out until you do so)*.

2. Choose a Hot-Key combination from the pull-down menus for the Pan Lock, Zoom In and Zoom Out options.

3. After making your selections, click on the Save button to store your new values.

2. Choose a Hot-Key combination from the pull-down menus for the Pan Lock, Zoom In and Zoom Out options.

3. After making your selections, click on the Save button to store your new values.

Monitor

Use the Monitor Setup utility to select the display parameters for your monitor. A list of video resolutions are displayed. The vertical refresh rates available are selectable from the drop-down menu of each resolution.

Make your monitor selection simply by clicking on the drop down list, or by selecting the Custom option and inserting your own values. *If your display appears distorted, it is likely that the values you selected are inappropriate for your monitor. Select other values.*

1. From the Orchid Control Panel click on Monitor Setup. The following screen appears:
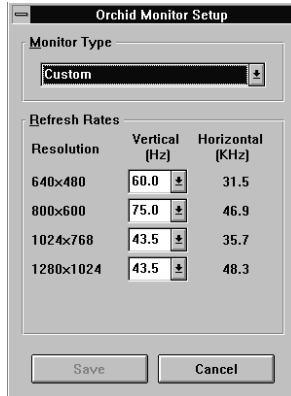
Figure 2.5: Power Management Menu

2. Make your desired selections and click on the Save button to store your new values.

MPEG Video

This utility allows you to configure the IRQ, DMA, and I/O Port Address for MPEG video. These settings are automatically configured using available addresses during the Kelvin MPEG software installation. To use MPEG, you must enable the MPEG Drivers selection. You can access the MPEG Video utility from the Orchid program group or from the Windows Control Panel window.

To configure MPEG Video:

1. From the Orchid Control Panel click on MPEG Video. The following menu appears:

For help on avoiding address conflicts, refer Appendix A.

Figure 2.7: MPEG Video Menu

2. Make your desired selections and click on the Save button to store your new values.

System Information

This option provides a visual way of obtaining relevant information about your system configuration. The information on this menu screen will be very helpful if you need to call Technical Support. You can access the System Information option from the Orchid program group or from the Windows Control Panel window.

To access System Information:

1. From the Orchid Control Panel click on the Help option and select System Information. The following menu appears:

Figure 2.8: System Information Menu

2. If you need to make any changes to the system information settings, click on Edit System Files to access the System Configuration Editor program.

Kelvin MPEG Border Adjust

At different resolutions and color depths, the Kelvin MPEG viewing window alignment changes. When this happens, a magenta color border will appear. The Kelvin MPEG Border Adjust is a Windows utility that allows you to adjust the alignment of the viewing window. Use this utility to check the border alignment before attempting to play MPEG files.

You should always check your border alignment after your first installation and after changing your Windows graphics display driver. If the alignment is not set correctly, the viewing may appear out of sync when you go to full screen.

1. From the Kelvin MPEG group, double-click on the Border Adjust icon. The following screen appears:
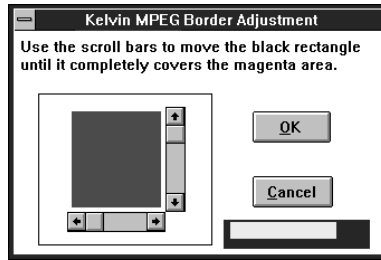
Figure 2.9: Border Adjust Screen

2. Use the horizontal and vertical scroll bars to adjust the viewing window until the magenta color areas are completely gone. This is very important because you may have problems even if there is only a tiny bit of magenta showing.

3. Click on OK to save the new settings.

Kelvin MPEG Mixer

If you are using Kelvin MPEG without a sound card, or want to control the MPEG audio output levels separately, this utility allows you to adjust the volume of MPEG audio (from MPG and ABS file formats).

1. From the Kelvin MPEG group, double-click on the Kelvin MPEG Mixer icon. The following screen appears:
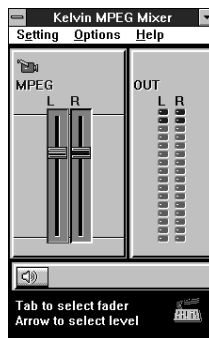
Figure 2.10: Mixer Menu

The Kelvin MPEG Mixer displays a window with a set of slide bars and a set of colored lights. The slide bars represent the left and right channels of MPEG audio. The colored lights represent the peak levels of the MPEG audio output.

- You can lock the left and right channels together to adjust their levels at the same time. Pull down the Options menu and click on the Lock L/R Vol option.

- To turn the sound ON and OFF, press the Mute button located in the lower left hand corner of the screen.

- To adjust the volume, click and drag the slide bars to the desired levels.

- Pull down the Settings menu and select Save to write the current settings to disk, or select Exit to save the current settings for this session of Windows but do not write it to disk.

Kelvin MPEG Demo CD Player

The Kelvin MPEG Demo CD Player is a Windows utility for playing the Kelvin MPEG Demo CD. You can also use the Kelvin MPEG Demo CD Player to make certain your Kelvin MPEG card is functioning properly.

1. Insert the Kelvin MPEG Demo CD into your CD-ROM drive.

2. From the Kelvin MPEG group, double-click on the Demo CD Player icon. The following screen appears:

Figure 2.11: Demo CD Player Screen

MPEG files on the Kelvin MPEG Demo CD are categorized into the following sections: Business, Education, Games, Music and Clip. With the Kelvin MPEG Demo CD Player, you can play the entire demo or just a few clips from your favorite section.

Using the Kelvin MPEG Demo CD Player

The Kelvin MPEG Demo is programmed to automatically start playing after 30 seconds of screen inactivity. You can use the Volume Control Bar to raise or lower the sound level of the Kelvin MPEG Demo. As the Kelvin MPEG Demo plays, the Status Window is updated to display the file name of the current video clip. The Progress Bar indicates the progression of the MPEG file being played.

If you want to replay a video clip, press the Skip to Previous button. If you want to skip to the next video clip, press the Skip to Next button. Use the Rewind and Advance buttons to move forward or backwards within the same video clip. To end the video clip, press the Stop button. To resume play, press the Play button. If you want to freeze an image on your screen, press the Pause button. When you are ready to continue playing the video clip, press the Play button. Press the Maximize Box to view the video clip in full-screen mode. To toggle the video clip from standard speed to slow motion, press the Slow Motion On/Off button. Audio is turned OFF when Slow Motion is ON.

To close the Kelvin MPEG Demo CD Player window, you can either click on the Control Menu Box and choose Close, or press the Power button. To reduce the Kelvin MPEG Demo CD Player window to its smallest size, press the Minimize box.

To view all of the video clips in a certain section, select a section title name (i.e., Business). The first video clip in the section will automatically start to play. When you have viewed all of the files in the section, the first clip in the next section will begin to play. The demo will automatically repeat when it reaches the end.

Windows Media Player

You can also use the Windows Media Player for playing MPEG files. The Windows Media Player is normally found in the Accessories program group.

1. Double-click on the Media Player icon to activate the program.

2. Choose Kelvin MPEG from the Device menu.

3. Select the MPEG file that you wish to play and press the Play button to begin playing the file.

4. From the File menu, choose Exit to quit the Windows Media player.

DOS UTILITIES

KSCAN Monitor Setup

With a few simple keystrokes, the KSCAN utility program allows you to define your monitor type and select a video mode for your monitor. Using KSCAN, you can also center the screen on your monitor while in Video Modes Preview.

The Kelvin MPEG software program automatically installs KSCAN to your hard drive. Because it is a DOS-based utility, do not run KSCAN from inside other programs, such as Windows. To run KSCAN from the DOS prompt, type:

CD\KMPEG   Enter ←

then

KSCAN   Enter ←

The following menu appears:

If you do not have a mouse driver loaded in DOS, or if you prefer using the keyboard, use the TAB key to move around the menus.
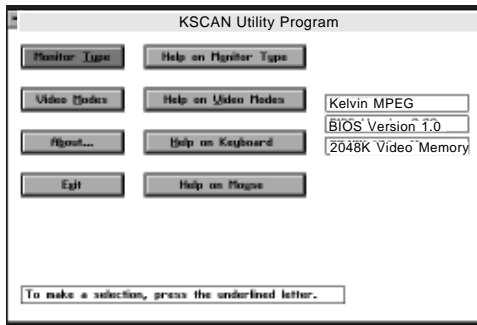
Figure 2.12: KSCAN Main Menu

This menu displays the BIOS version of your Kelvin MPEG and the amount of video memory installed. From this menu, you can configure your monitor type and preview all the video modes supported by your monitor. The video modes available to you depend on your monitor type and the amount of memory installed on your Kelvin MPEG.

Selecting the Monitor Type

Selecting the proper monitor type allows Kelvin MPEG to display the highest quality output supported with your monitor. From the main menu select Monitor Type, and the following menu appears:
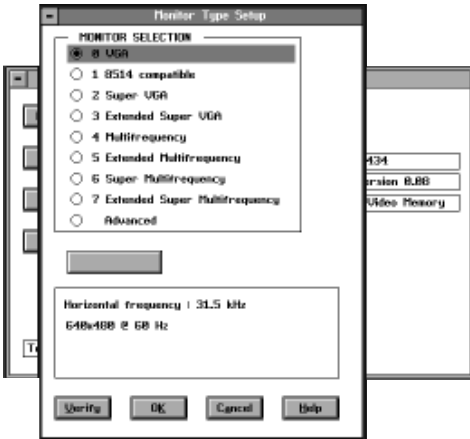
Figure 2.13: Monitor Type Setup

This screen displays a list of different monitor types. Use a mouse or TAB key on your keyboard to select your monitor type. *NOTE:* To use a mouse, the mouse driver must be installed in DOS before running the KSCAN utility program.

The resolutions and refresh rates available for your monitor are listed in the box below the monitor selections. Selecting the Advanced monitor selection allows you to customize the monitor timings for your monitor, more on this option in the Advanced Monitor Setup section.

If you are not sure what type of monitor you have, consult your monitor's reference guide.

After making your selection, select the Verify button to check that the setting selected is compatible with your monitor. The Verify option will test each video mode available for your monitor type. Each test screen is displayed with a set of color blocks and sample text. The mode number and mode being tested is displayed at the

bottom of the screen. Press ENTER to move through each mode available. You can abort the test at any time by pressing the ESC key.

If any of the screens appear distorted, rolling, or unread-able, or if the program hangs up, it is likely that the monitor type you selected is incorrect. Consult your monitor's reference guide before making another selection. After you have verified your selection, select the OK button to save your setting, or press the Cancel button to discard the change. Once you select the OK button, your selec-tion is saved in the AUTOEXEC.BAT file.

Advanced Monitor Setup

You can customize the monitor timings for your monitor to achieve the highest vertical refresh rates available. From the Monitor Type Setup menu, select Advanced. Once you select Advanced, the gray button will show Set Advanced. Select Set Advanced and the following menu appears:

Setting the incorrect values may damage your monitor. Consult your monitor's reference guide for the vertical refresh rates available.
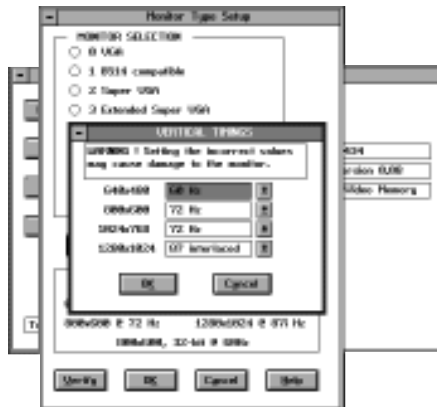
Figure 2.14: Advanced Monitor Type Setup

Selecting the Set Advanced button displays a dialog box with drop-down menus for each available resolution. Select the desired vertical refresh rate for each resolu-

tion. After making your selections, press the Verify button to check that the setting selected is compatible with your monitor. The Verify option will test each video mode available for your monitor type.

Video Modes

The Video Modes option displays all video modes supported, based on your monitor type and amount of video memory installed on Kelvin MPEG. From the main menu, select Video Modes. From the Video Modes screen, select Preview.

To see what a mode will look like on your monitor, highlight the mode, then select Preview. There are several test screens for each mode selected. Press ENTER to move through each test screen. You can center the screen for each resolution by using the arrow keys. Abort the test at any time by pressing the ESC key.

KMPGTEST

KMPGTEST is a DOS batch file that executes a program to play a short MPEG file from the Kelvin MPEG Demo CD. This MPEG file checks the hardware installation of the Kelvin MPEG card. To run KMPGTEST from the DOS prompt, type:

CD\KMPEG   `Enter ←`

then

KMPGTEST   `Enter ←`

To begin playing an MPEG file:

1. Choose Change Dir from the File menu.

2. In the Directory Name box, enter the drive and directory path of the MPEG file you want to play.

3. Choose Open from the File menu (or press F3).

4. In the Filename box, enter the name of the file you want to play and press ENTER. You can also use the Tab key to move the cursor down to the Files list.

    Use the directional arrow keys to move the cursor and select the file you want, and then press ENTER. The file will play until you choose Close File (Alt + F3) or Quit (Alt + X). If a mouse is available, clicking the green box at the upper left corner of the viewing window will also close the file.

Adjusting the Viewing Window

You can adjust the size of the viewing window by dragging the lower right corner of the window (shown in green) with the mouse cursor. If a mouse is not available, use the following steps to adjust the viewing window:

1. Press Ctrl + F5 (this turns the frame around the viewing window from white to green).

2. Use the Shift key plus one of the directional arrow keys to adjust the viewing window to the desired size.

3. Press ENTER to approve the window size (the frame turns to white again).

If a mouse is available, you can maximize the viewing window by clicking the green up arrow at the upper right corner of the viewing window. Reduce the window to its original size by clicking the green up and down arrows. Pressing the F5 key will put the viewing window into full-screen mode. Press any other key to return to the normal screen.

Exiting Test

Press Alt + X or choose Exit from the File menu to quit the program.

The DOS Mixer

If you are using Kelvin MPEG without a sound card, or want to control the MPEG audio output levels separately, this utility allows you to adjust the volume of MPEG audio (from MPG and ABS file formats). To run the mixer program from the DOS prompt, type:

CD\KMPEG   [Enter ←]

then

DOSMIXER   [Enter ←]

The following screen appears:

Figure 2.15: DOS Mixer Menu

The slide bars represent the left and right channels of MPEG audio. Above the slide bars is the LOCK button. This button locks the left and right channels together so you can adjust their levels simultaneously. The Enter key toggles the LOCK button. Clicking the mouse with the cursor on the button also toggles it.

Use the up and down arrow keys to adjust the volume. If a mouse is available, click on and drag the slide bars to make the adjustments.

When finished, press ESC or click the Exit button to return to DOS. The adjusted volume is saved for future reference.

Kelvin MPEG DOS Driver

In order for Kelvin MPEG to work under DOS, you must load the Kelvin MPEG DOS driver—FMPDRV. Some games require you to load this driver before they will play. If the Kelvin MPEG DOS driver is not loaded before you start some games, a "Driver not loaded" message appears. To load the driver from the DOS prompt, type:

CD\KMPEG   `Enter ←`

then

FMPDRV   `Enter ←`

You can now use Kelvin MPEG programs that run in the DOS environment. This driver is a terminate-and-stay-resident (TSR) program. When the driver is memory resident, it takes up 96KB of memory.

To unload it from memory while you are in the Kelvin MPEG directory, type FMPDRV /U at the DOS prompt and press ENTER or reboot your system. This driver cannot be loaded into high memory unless you have more than 58KB of contiguous upper memory.

Section

3

Your CD-ROM drive must be XA, Mode 2, Form 2 compatible to play Video CD or CD-i Digital Video CD formats.

KELVIN CD STATION

The Kelvin CD Station utility plays a variety of CD formats. It will automatically detect and play movies in Video CD and CD-i Digital Video format (provided your CD player supports CD-i and Video CD), and MPG files from a standard data CD-ROM. If you have a sound card installed, Kelvin CD Station will also play audio tracks from standard audio CDs.

Kelvin CD Station features a standard VCR interface for ease of use, and offers advanced features such as looping and random playback. It allows you to create a customized play list of your favorite files or tracks. Using the capture function, you can save any scene from the viewing window into a Windows BMP (bitmap) file in full 16.8 million colors at 352 x 240 resolution.

1. From the Kelvin MPEG group, double-click on the Kelvin CD Station icon. The following screen appears:

Figure 3.1: Kelvin CD Station Main Menu

2. Insert your CD and press Play.

Standard Control Buttons

The Standard Control Buttons resemble a standard VCR interface. The buttons are described from left to right on the main panel as follows:

Tray Open/Close

Acts as the Eject or Tray Open/Close button of your CD-ROM drive (applicable only if your CD-ROM drive supports this feature).

Stop

Click this button to stop playing current selection.

Pause

Click to pause playback of the current clip (press Play button to resume playing).

Play

Click to initiate playback.

Rewind & Advance

Click to skip backward or forward within the same video clip.

Skip to Previous/Next

Click to move between the previous or next clip.

Repeat

Click to toggle looping play of the selected clips (the default is OFF).

Play Mode

Click to cycle the play mode between All clips in sequence, all clips in Random order, or PlayList in sequence modes (the default setting is ALL).

Capture

This button allows you to capture the image in the playing window into a Windows BMP (bitmap) file. When you click this button, playback will pause and a file menu appears to allow you to save the image. The image is captured in its original resolution (normally 352 x 240) in 16.8 million colors.

Custom Control Buttons

The buttons are described from left to right on the main panel as follows:

Time/Counter

Toggles the on-screen display of the track number and elapsed time of the track being played.

Maximum Size

Expands Kelvin CD Station to fill your entire screen.

Power

Press this button to exit the Kelvin CD Station.

Play List

Click this button to bring up the Play List Window, which allows you to create a sequential list of your favorite clips for playback.

Full Screen

Pressing this button causes the current clip to occupy the entire screen area. Clicking the left mouse button brings

up the Control Panel Interface. Click on the playing window to hide the Control Panel Interface. To return to the normal Kelvin CD Station interface, click on the Window button.

Volume bar

Click and drag the volume bar to control the volume of the audio signal.

Display Panel

The Display Panel shows the type of CD currently in the drive and provides information about the current clip, such as its track number and play time. The Progress Bar (with the progress indicator shown in red) tracks the progression of the clip being played. You can click and drag this bar to jump to different sections of the video clip.

The symbols and words on the right of the play time show the status and play modes. Either the play or pause status light will be lit during play. The straight or looping arrow symbols indicate whether the CD will play through once or if it will be repeated continuously. The words All, Playlist and Random indicate whether all the files and tracks on the CD will play in sequence or randomly, or whether files and tracks listed in the PlayList will play in the order indicated.

The Status Window (shown when the standard controls are hidden) displays the name of the clip being played.

Play List Window

1. To open the Play List Window, click on Play List (custom control button group) and the following screen appears:

Figure 3.2: Play List Screen

2. From this window you can create a Play List of your favorite clips. *NOTE:* This can only be done with CDs that have more than one track and are not Video CD 2.0 format.

Creating a Play List

1. Select the clip that you wish to add to the Play List from the Title List, and then drag it over the Play List box.

2. To move all the clips in the Title List to the Play List, press the Sel. All (Select All) button.

3. To remove all of the clips in the Play List, press the Clr. All (Clear All) button.

4. To remove a clip from the Play List, select the clip and drag it to the Title List box.

5. To change a clip's playing order, drag and reposition its icon in the Play List box.

6. Click on OK when you have finished adding clips to the Play List. Click the Play Mode button in the main

window until the word Play List appears lighted in the Display Panel. All clips included in the play list will play in the order indicated.

7. To cancel your modifications, press the Cancel button.

Select Buttons (Video CD 2.0 only)

Video CD 2.0 discs feature embedded playback controls. When you play a Video CD 2.0 disc, Kelvin CD Station displays the following additional Select Buttons at the lower right corner.

Once you click on the selection number, this number appears in the display panel. Use the left arrow to erase the last entry and the right arrow to choose the default. Press Enter to accept your selection.

Standard Control Cover Button

Use this button as a toggle switch to cover or uncover the Standard Control Buttons. When these buttons are covered, the display panel shows the name of the selection being played.

Custom Control Cover Button

Use this button as a toggle switch to cover or uncover the Custom Control Buttons.

Appendix

A

TECHNICAL INFORMATION

Orchid Technology is known for its responsiveness to its customers. This section gives you helpful hints for trouble-shooting Kelvin MPEG and includes the technical specifications.

CompuServe

In addition to calling Orchid Technology, technical support is now available through the CompuServe Information Service (CIS). You can also download drivers and get new product information. To find us on CompuServe, follow the instructions below:

1. Log onto CompuServe.

2. You may type GO ORCHID to get immediate access to the Orchid section. . .

<p align="center">or</p>

Type GO MULTIBVEN to get into the Multimedia Vendor Forum B. Once you are in this forum, select Message Section #10. The message and library sections are labeled Orchid.

All commands can be typed in lower or upper case letters.

Troubleshooting the Kelvin MPEG

The following information will help you diagnose problems you may have with the Kelvin MPEG. Following these simple steps serves a two-fold purpose:

You may be able to fix your problem and avoid having to contact the Orchid Technology Technical Support Department,

<p align="center">or</p>

if these steps do not help you solve your problem, the results will most certainly give you a better handle on what to tell Technical Support

once you do contact them. The information provided here is in symptom/response form. That is, a symptom is given, and a check point response is provided for you.

Symptom 1

The computer does not power-up or respond when powered on. The screen is completely blank. There is no familiar boot up (POST test) beep.

Check

1. Is the Kelvin MPEG properly installed in the slot? Is the edge connector inserted all the way into the expansion slot? Is the Kelvin MPEG properly aligned with the motherboard's backplane?

2. Is there another display adapter in your system? If it is an on-board video display adapter, make sure it is disabled. If the video display adapter is other than a standard MDA video adapter, remove it from the system.

3. Is the computer set up correctly for the Kelvin MPEG? Refer to your computer's reference manual for information on setting up your computer.

4. Are your computer and monitor plugged in? Check the power cables to your computer and monitor.

Symptom 2

The computer gives an error of 1 long beep and 2 short beeps at power up.

Check

1. Take a look at the check points for symptom 1, steps 1 through 4.

Symptom 3

The computer seems to boot up properly but there is no display.

Check

1. Is your monitor plugged in? Check the power cable to your monitor.

2. Is your monitor cable fastened securely and properly? Check both the connection at the monitor and at the Kelvin MPEG card.

3. Is your monitor cable the correct kind for the Kelvin MPEG? Check Section 1 for the proper pin-out information to determine if your cable is correct.

4. Is there another display adapter in your system? If it is an on-board video display adapter, make sure it is disabled. If the video display adapter is other than a standard MDA video adapter, remove it from the system.

Symptom 4

The display loses synchronization once it gets into a graphics program.

Check

1. Is the vertical hold on your monitor properly set? Is your software properly installed for your current application? Check Section 2 for device driver information.

3. Is your monitor able to display the graphics mode you are using? Double check your monitor specifications to determine if you are operating in a graphics mode that your monitor simply cannot handle.

4. Are you using the correct vertical refresh rate for your monitor? Double check your monitor specifications for the refresh rates supported.

Symptom 5

The Kelvin MPEG works well in another brand computer, but not at all in mine.

Check

1. Take a look at the check points for symptom 1, steps 1 through 4. It is a pretty good guess that the problem is not the Kelvin MPEG if it is working properly in another system.

Symptom 6

The Orchid icon does not appear in the Windows Control Panel.

Check

1. Check to make sure that you installed the Kelvin MPEG Windows drivers into the correct directory.

2. Memory managers can prevent icons from appearing. Refer to your memory manager documentation for details on using memory managers.

Symptom 7

When running in Windows, the picture in the Kelvin MPEG viewing window goes out of sync when I maximize the window.

Check

1. The alignment of the viewing window is off. Use the Kelvin MPEG Border Adjust utility to align the viewing window (refer to Section 2).

2. Check to see if you have the Virtual Screen or Switch-on-the-Fly Magnify feature enabled, if so, disable the feature.

Symptom 8

The sound seems to be skipping when I play an MPEG file from the CD-ROM drive.

Check

1. Your CD-ROM drive does not meet the MPC Level 2 requirements. An MPC Level 2 compliant CD-ROM drive has a sustained data transfer rate of 300KB/sec, and an average seek time of 1 second.

Symptom 9

My CD-ROM is MPC Level 2 compliant, but the sound is skipping when I play an MPEG file.

Check

1. It is possible that even though the CD-ROM drive is fully MPC Level 2 compliant, the CD-ROM driver is not fully optimized. Try adjusting the CD-ROM driver's buffer size to optimize its performance. This can be done by changing the /M parameter of the MSCDEX statement in the AUTOEXEC.BAT file.

2. Your system may be too slow. Kelvin MPEG requires a system with a 25MHz 386SX or better processor to meet its performance requirements.

Symptom 10

I have a fast enough computer and an MPC Level 2 compliant CD-ROM drive, but the sound is still skipping.

Check

1. Check the BIOS and CMOS setup of the system. Make sure the system is running at the maximum speed and the I/O bus is running at 8MHz or higher. Some systems have a "Turbo Switch" function. Make sure this function is either turned ON or completely disabled, so your system is always running at the highest possible speed.

2. Try adjusting the buffer size of the MSCDEX statement in your AUTOEXEC.BAT file. Try more or less buffers to find the optimum buffer size for your particular system (refer to your CD-ROM user's manual).

Symptom 11

MPEG plays fine under DOS, but the sound skips under Windows.

Check

1. If you have a 386 computer, try running Windows 3.1 in Standard Mode (type WIN/S and press ENTER when starting Windows).

Symptom 12

The video window color is magenta. I cannot see any video.

Check

1. Run the Kelvin MPEG Border Adjust program to adjust the alignment of the viewing window (refer to Section 2). You should always check your border alignment after your first installation and after changing your Windows graphics display driver.

2. Your graphics card must be set in one of Kelvin MPEG's supported resolutions (refer to "Kelvin MPEG Resolutions and Refresh Rates" in this section).

3. Check to see whether another card in your system is using the same Port, DMA, or IRQ address as Kelvin MPEG. Refer to "Avoiding Address Conflicts" in this section.

Avoiding Address Conflicts

Please write down all address settings for future reference.

A conflict may occur if you have another card in your system using the same IRQ or memory addresses as Kelvin MPEG. Resolve the conflict by selecting another available address. When selecting a different address, please *note* the following information:

☞ A BUS mouse commonly uses I/O address 240H

☞ Network cards commonly use the following addresses:

> IRQ 10 or 11
>
> I/O 300H, 320H, 340H or 360H

☞ Other devices such as SCSI cards, hard disks and CD-ROM drives commonly use the following addresses:

> IRQ 10, 11, 14 or 15
>
> I/O 330H or 340H

☞ I/O and DMA conflicts will normally lock up your system.

Technical Specifications

This section covers the specifications of the Kelvin MPEG.

Configuration
Kelvin MPEG - 1024 KB
Kelvin MPEG - 2048 KB

Graphics Chipset:
Cirrus Logic CL-GD5434

MPEG Video Chipset:
C-Cube CL450

MPEG Audio Chipset:
Analog Devices 2105

RAM Chips:
256KB x 16, 70 nanoseconds or faster DRAM

Computers Supported:
386, 486 and compatibles
Pentium-based systems

BIOS:
8-bit

Bus Connector:
32-bit

Card Size:
9.34" x 3.34"

Output Connectors:
Standard 15-pin D-Shell VGA
Feature Connector (VESA bi-directional)

Memory Address Segments:
   RAM: A000-BFFF

   ROM: C000-C7FF

   I/O Address: 3B0-3DF (IBM standard)

Temperature:
   Operating: from 0 to 40 degrees C
   Storage: from -25 to 90 degrees C

Humidity:
   Operating: from 15% to 90%
   Storage: from 0% to 90%

Additional Features

High resolutions and refresh rates:
   75Hz Vertical Scan Refresh Rate

   640 x 480 up to 16.8 million colors

   800 x 600 up to 16.8 million colors *

   1024 x 768 up to 65,536 colors *

   1280 x 1024 up to 256 colors *

   * Requires 2MB of memory

VESA Support

Kelvin MPEG is designed to support the VESA BIOS Extension (VBE) through its BIOS. The VESA BIOS Extension standard is a separate standard from VESA Local BUS (VLB). Extended modes can be selected through the VESA option in the application you are running. The BIOS supports the VESA 1.2 specification.

File Formats Supported

MPG Files

MPG is the extension for files with PC-based, MPEG-compressed full motion video (color video shown at resolutions up to 1024x768 at the rate of 24, 25, or 30 frames per second), along with MPEG-compressed audio (44.1kHz, stereo, 16-bit sound). This type of file is also known as a system file or an interleaved stream.

ABS and MPA Files

ABS (Audio Bit Stream) and MPA (MPEG Audio) are the extensions for files containing MPEG-compressed audio only.

VBS and MPV Files

VBS (Video Bit Stream) and MPV (MPEG Video) are the extensions for files containing MPEG-compressed video only.

DAT Files

DAT is the extension for Video CD or Karaoke CD files. It is also a commonly used file extension for data files of many applications. Only Video CD and Karaoke CD DAT files will work with the Kelvin MPEG.

Resolutions and Refresh Rates

Mode #	Resolution	Colors	Horz.	Vert.	Polarity	
04	320 x 200	4	31.5	70	-	+
05	320 x 200	4	31.5	70	-	+
06	640 x 200	2	31.5	70	-	+
OD	320 x 200	16	31.5	70	-	+
OE	640 x 200	16	31.5	70	-	+
OF	640 x 350	Mono	31.5	70	+	-
10	640 x 350	16	31.5	70	+	-
11	640 x 480	2	31.5	60	-	-
12	640 x 480	16	31.5	60	-	-
13	320 x 200	256	31.5	70	-	+

Table A1: IBM VGA Video Graphics Modes

Mode #	Resolution	Colors	Horz.	Vert.	Polarity	
00	40 x 25	16	31.5	70	-	+
01	40 x 25	16	31.5	70	-	+
02	80 x 25	16	31.5	70	-	+
03	80 x 25	16	31.5	70	-	+
07	80 x 25	Mono	31.5	70	-	+
54	132 x 43	16	31.5	70	+	-
55	132 x 25	16	31.5	70	-	+

Table A2: Video Text Modes

Horizontal frequencies are in kHz
Vertical frequencies are in Hz

Mode #	Resolution	Colors	Horz.	Vert.	Polarity	
100	640 x 480	256	31.5	70	-	-
101	640 x 480	256	31.5	60	-	-
			37.5	75	-	-
102	800 x 600	16	35.2	56	-	-
			37.9	60	+	+
			47.5	72	+	+
			46.9	75	+	+
103	800 x 600	256	35.2	56	-	-
			37.9	60	+	+
			47.5	72	+	+
			46.9	75	+	+
104	1024 x 768	16	35.7	43.5 (I)	+	+
			48.4	60	-	-
			56.5	70	-	-
			60.0	75	-	-
105	1024 x 768	256	35.7	43.5 (I)	+	+
			48.4	60	-	-
			56.5	70	-	-
			60.0	75	-	-
106	1280 x 1024	16	48.3	43.5 (I)	-	-
107 [1,2]	1280 x 1024	256	48.3	43.5 (I)	-	-
			64.9	60	-	-
			76.0	71	-	-
109	132 x 25	16	31.5	70	-	+
10A	132 x 43	16	31.5	70	+	-
110	640 x 480	32K	31.2	60	-	-
			37.4	75	-	-

Table A.3: VESA Video Graphics Modes

Horizontal frequencies are in kHz
Vertical frequencies are in Hz
(I) indicates interlaced mode
[1] 2MB of DRAM memory required
[2] MPEG video not available in this mode

Mode #	Resolution	Colors	Horz.	Vert.	Polarity	
111	640 x 480	64K	31.2	60	-	-
			37.4	75	-	-
112 [1,2]	640 x 480	16.8Mil	31.5	60	-	-
			37.5	75	-	-
113	800 x 600	32K	35.2	56	-	-
			37.9	60	+	+
			47.4	72	+	+
			46.9	75	+	+
114 [3]	800 x 600	64K	35.2	56	-	-
			37.9	60	+	+
			47.4	72	+	+
			46.9	75	+	+
115 [1,2]	800 x 600	16.8Mil	35.2	56	-	-
			37.9	60	+	+
116 [2]	1024 x 768	32K	35.7	43.5 (I)	+	+
			48.4	60	-	-
			56.5	70	-	-
			60.0	75	-	-
117 [1,2]	1024 x 768	64K	35.7	43.5 (I)	+	+
			48.4	60	-	-
			56.5	70	-	-
			60.0	75	-	-

Table A.4: VESA Graphics Modes (cont.)

Horizontal frequencies are in kHz
Vertical frequencies are in Hz
(I) indicates interlaced mode
[1] 2MB of DRAM memory required
[2] MPEG video not available in this mode
[3] MPEG video available at 60Hz only

Feature Connector Pin Outs (VESA Standard)

The VESA standard Feature Connector (or Auxiliary Video Connector as it is sometimes called) is located at the top of the Kelvin MPEG (see Figure 1.1). The feature connector permits third party add-on accessories to both share signals and share control of the VGA circuitry. The following table lists the feature connector's pin-out information:

Kelvin MPEG Feature Connector Pin-Outs							
Pin	Function	Pin	Function	Pin	Function	Pin	Function
Y1	Pixel Data 0	Y8	Pixel Data 7	Z2	Ground	Z9	Ground
Y2	Pixel Data 1	Y9	Pixel Clock	Z3	Ground	Z10	Ground
Y3	Pixel Data 2	Y10	Blanking	Z4	(See Note 1)	Z11	Ground
Y4	Pixel Data 3	Y11	Hor. Sync	Z5	(See Note 2)	Z12	No Connect
Y5	Pixel Data 4	Y12	Vert. Sync	Z6	(See Note 3)	Z13	No Pin (Key)
Y6	Pixel Data 5	Y13	Ground	Z7	No Connect		
Y7	Pixel Data 6	Z1	Ground	Z8	Ground		

Table A.5: VESA Feature Connector Pin-Outs

NOTES:

(1) Low Enable External Pixel Data Input to the motherboard DAC.

(2) Low Enable External Sync and Blanking Inputsto the motherboard DAC.

(3) Low Enable External Pixel Clock Input to the motherboard DAC.

VGA Pin-Out Specifications

The 15-pin VGA connector on the Kelvin MPEG is the same as the standard 15-pin D-shell connector. The pin-outs are as follows:
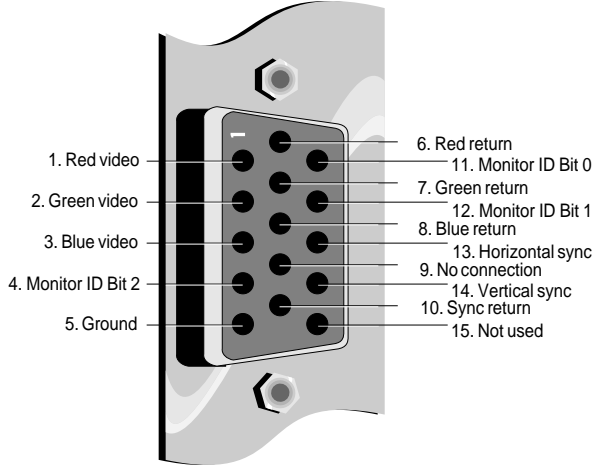

1. Red video
2. Green video
3. Blue video
4. Monitor ID Bit 2
5. Ground

6. Red return
11. Monitor ID Bit 0
7. Green return
12. Monitor ID Bit 1
8. Blue return
13. Horizontal sync
9. No connection
14. Vertical sync
10. Sync return
15. Not used

Figure A.1: Kelvin MPEG 15-pin Connector

Appendix

B

GREEN PC

Orchid stays on the cutting edge of technology while maintaining compatibility. With the Kelvin MPEG, we took a power saving approach by incorporating the Green PC technology. The following information details the Green PC technology.

Green PC Feature

The Power Management feature supports the Green PC specification and allows a computer system to be energy efficient. On computer desktop systems, monitors usually consume over 50% of the overall power used. Most monitors consume between 130-200 watts, even when idling.

Using a Green PC monitor and a Kelvin MPEG in conjunction, you can lower the power consumption to 30 watts when the monitor is idle. This power management feature is required by the EPA's Energy Star Program and is also required by all U. S. Government agencies.

A Green PC monitor and your Kelvin MPEG can be placed into one of four states: On, Standby, Suspend or Off. Here is an overview of VESA's DPMS signaling method:

Monitor State	Power Savings	Recovery Time
On	None	N/A
Standby	Minimal	Short
Suspend	Substantial	Longer
Off	Maximum	System-dependent

On Mode

Sets the amount of inactive time before the screen saver starts. This is a full operation state with both the HSYNC Active and VSYNC Active.

Sets the amount of inactive time before the blank screen starts. This is an optional state of minimal power reduction with the HSYNC Inactive and VSYNC Active.

Suspend Mode

Sets the amount of inactive time before the blank screen starts. This is a significant reduction of power consumption with the HSYNC Active and VSYNC Inactive.

Off Mode

Set the amount of inactive time before the blank screen starts. This is the lowest level of power consumption with the HSYNC Inactive and VSYNC Inactive.

The VESA DPMS technology also implements the U. S. Governmental Protection Agency "Energy Star" and European Nutek standards. The Power Management feature makes Kelvin MPEG a complete cost-effective solution for the energy conscious.

Appendix

C

DIGITALVIDEO™ AND VIDEOCD MOVIES

In addition to all the game, entertainment, educational and business software, your Kelvin MPEG is also capable of playing CD-i DigitalVideo CD movies from Philips, and movie CDs in the new VideoCD format. New titles are being added everyday to the current library of movie hits and music videos.

You can use the Windows Media Player and the Kelvin MPEG VideoCD Movie Player for DOS to play CD-i and VideoCD movies. All you need is a CD-ROM drive that is capable of reading CDs in these two formats.

The Philips CD-i DigitalVideo movies are recorded in Green Book format, and the VideoCD movies are recorded in White Book format. In either case, the CD-ROM drive must be XA, Mode 2, Form 2 capatible. Check your CD-ROM user's manual to make sure your CD-ROM drive meets this requirement before attempting to play CD-i or VideoCD movies.

Playing CD-i or VideoCD with Windows Media Player

1. Place a CD-i or VideoCD movie disc into your CD-ROM drive.

2. Start Windows if you have not already done so.

3. Double-click on the Media Player icon (usually found in the Accessories program group).

4. From the Device menu, select CD-i/VideoCD Movie.

5. To start the movie, click on the Play button. The movie will appear in a separate viewing window. The Pause button allows you to pause the movie during play. Press Play again to start the movie from the point where the Pause button was pressed. The Stop button will stop the movie and set the counter back to the beginning. The movie will play to the end unless

For detailed instructions on how to use Windows Media Player, please refer to the Windows User's Guide.

you pause or stop it by pressing the Pause or Stop button.

Each CD-i and VideoCD disc contains about 55 minutes of video and most movies comes in a 2-disc set. When Disc 1 comes to an end, the picture in the viewing window will stop. Press the Stop button before ejecting Disc 1 and inserting Disc 2.

Playing VideoCD Movies with Kelvin MPEG VideoCD Player in DOS

The Kelvin MPEG Setup program installs a DOS VideoCD Player in the Kelvin MPEG subdirectory. The Kelvin MPEG VideoCD Player will only play VideoCD discs. It will not recognize or play CD-i movie discs. To play a VideoCD, place a VideoCD movie disc into your CD-ROM drive and type:

CD\KMPEG   [Enter ←]

then

VPLAYER   [Enter ←]

VideoCD Player occupies the entire screen. Click on the Play button to start the movie. (If your mouse is not active, use the left and right arrow keys on your keyboard to select the Play button and then press ENTER to start the movie.) As the movie plays, the Status Window displays the name of the current movie and the current track number. The Progress Bar indicates the progression of the track as it plays.

VideoCD Player also provides the usual VCR-like controls for skipping to the next or previous track, fast forward or rewind, stop, and pause. There is also a Slow button to play the movie in slow motion (audio is turned off when slow motion is in effect).

If you want to watch the movie at full-screen (i.e., without the control buttons), press F5. Press F5 again to return

to the normal screen. To exit VideoCD Player, press ESC or click on the Power button.

NOTE: A more advanced version of the Windows Media Player is available with Microsoft Video for Windows and some special versions of Windows. This version has additional functions such as fast forward and auto-repeat. The version described here is the standard version.

FCC NOTICE

FCC ID: DDS7EF1194-KMPGVLB

Kelvin MPEG
Certified compliant with FCC Class B limits, part 15

To meet FCC requirements, shielded cables are required to
connect the unit to a Class B certified device

"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."

This equipment generates and uses radio frequency energy and, if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio or television reception.

This device has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. Only equipment (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this product.

If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

1. Reorient the receiving antenna.

2. Relocate the computer with respect to the receiver.

3. Move the computer away from the receiver.

4. Plug the computer into an outlet which resides on a different circuit breaker than the receiver.

5. If necessary, consult your dealer, or an experienced radio or television technician for additional suggestions.

You may find the booklet **How To Identify and Resolve Radio-TV Interference Problems** helpful. It was prepared by the Federal Communications Commission and is available from the U.S. Government Printing Office, Washington, DC 20402. Refer to stock number: 004-000-00345-4.

Orchid Technology is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

Operation with non-certified equipment is likely to result in interference to radio and TV reception. The user must use shielded interface cables in order to maintain the product within FCC compliance.

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