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SAFETY SUMMARY

Please read these instructions carefully before using your LP 420. Failure to comply with them could result in fire, electrical shock, personal injury or damage to equipment.

These graphics are used throughout this manual to draw your attention to important information about the projectors.

***NOTE**: Additional useful details or tips.*

***CAUTION**: Steps to take to avoid damage to your equipment.*

***WARNING**: Steps to take to avoid personal injury.*

These graphics are used on the projector's labels.

Attention - Refer to this User's Guide for important safety information.

CAUTION-Hot Surfaces - Avoid touching hot surfaces. Do not touch until the projector has cooled.

Do Not Look Into The Lens!

Be extremely careful not to look into the projection lens when the projector is turned on. The bright light may harm your eyes. Be especially careful to keep children from looking into the lens.

Power Source

Use only a three-wire grounding type power source. The power source should not exceed 275 volts rms between the supply conductors or between either conductor and the ground.

Power Cord

Use only the power cord that was shipped with the projector. Although other power cords might be similar in appearance, they have not been safety-tested with the projector. Do not use a power cord if it has become damaged or frayed. Contact your In Focus dealer or call In Focus if you need to replace your power cord.

Grounding

The projector is grounded through the grounding conductor on the power cord. To avoid electric shock, plug the power cord into a properly wired receptacle. Do not defeat the purpose of the grounding-type plug.

Lamp

To avoid overheating and unacceptable image quality, replace the projection lamp with a lamp of the specified type. Refer to page 33 for lamp specifications and to page 25 for instructions on replacing the lamp.

Lamp Compartment

To avoid burns, do not open the lamp module door until the projector is turned off and the lamp has cooled for at least 30 minutes. Follow the instructions in this manual for lamp replacement carefully.

Hot Surfaces

Allow the projector to cool at least 30 minutes before replacing a lamp. When you open the lamp housing, be very careful not to touch the hot surfaces inside.

Ventilation and Overheating

Openings in the projector case provide ventilation to protect it from overheating. Keep loose papers and other objects well away from the grills. Do not place the projector on top of or close to a computer or other heat-producing equipment.

Liquid Spills

Do not set drinks on top of the projector. Spilled liquids can flow inside and cause damage.

Do Not Disassemble

All service must be performed by an authorized In Focus service center. The only user-serviceable part in the projector is the projection lamp, which you can replace by opening the lamp cover on the side of the projector (see page 25). Do not open any other part of the projector. If your projector needs repair, call your local Authorized Service Provider or In Focus Technical Support as described on page 4. Before you call, refer to "Troubleshooting" starting on page 29 to see if you can resolve the problem yourself.

***NOTE**: If you open the projector case, you will void the warranty.*

INTRODUCTION

The In Focus LP 420™ is specifically designed for the mobile presenter. It packs SVGA graphics with 16.7 million colors into a small, 6.8 pound package. It generates crisp, clear images using Digital Light Processing™ (DLP) technology. The LP 420 is easy to connect, easy to use, and easy to maintain.

Image Resolution

The SVGA resolution of the 420's projected image is 800x600. Screen resolutions between 800x600 and 1024x768 are compressed to 800x600. The 420 cannot compress screen resolutions above 1024x768. If your computer's screen resolution is higher than 1024x768, reset it to a lower resolution before you connect the 420**.**

NOTE: *The 420 automatically expands 640x480 images to 800x600. You can display these images at 640x480 by turning off the Auto Resize feature. See "Auto Resize" on page 20 for more information.*

Compatibility

The projector is compatible with a wide variety of computers and video devices, including:

- IBM-compatible computers, including laptops, up to 1024x768 resolution.
- Apple Macintosh and PowerBook computers up to 1024x768 resolution.
- Most standard VCRs, camcorders and laser disc players.

Unpacking the Projector

The projector comes with the items shown in Figure 1. Check to make sure all are included. **Contact your In Focus dealer immediately if anything is missing**.

If you are experienced in setting up presentation systems, use the *LP 420 Quick Start* card that was included in the shipping box. For complete details on connecting and operating the projector, refer to this User's Guide. User's Guides are also available for download from our website at www.infocus.com.

NOTE: *The 420 ships standard with computer and audio cables. If you want mouse control of your computer, you must order the optional CableWizard and remote.*

NOTE: *The contents of your shipping box may vary depending on the projector configuration you've ordered.*

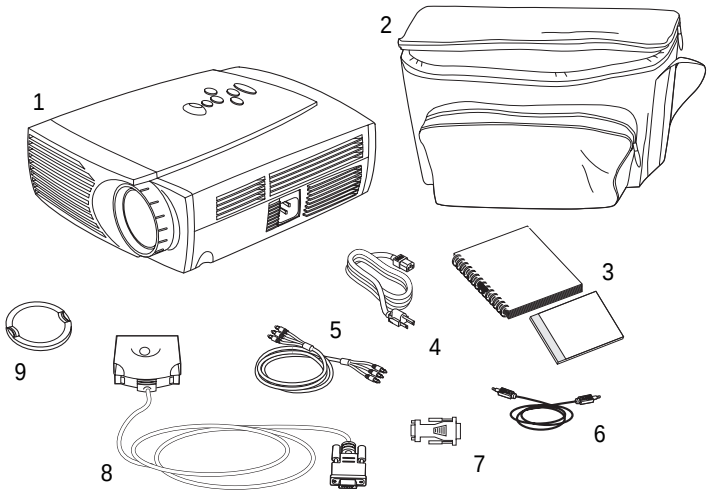

FIGURE 1

Shipping box contents

1. LP 420 projector
2. Soft carry case
3. *LP 420 User's Guide* and Online User Guide CD
4. power cord
5. RCA audio/video (A/V) cable
6. Audio cable
7. Macintosh adaptor
8. CableWizard Lite cable
9. Lens cap

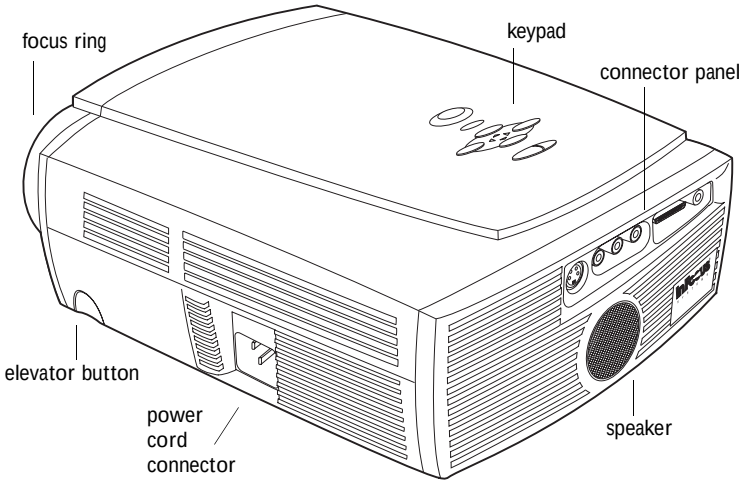

FIGURE 2

Side view of projector

Usage Guidelines

Do not look directly into the projection lens when the projector is turned on. The bright light may harm your eyes.

Do not block the grills on the projector. Restricting the air flow can cause it to overheat and turn off. If this happens, you must wait a minute before attempting to turn it back on.

Handle the projector as you would any product with glass components. Be especially careful not to drop it.

Avoid leaving the projector in direct sunlight or extreme cold for extended periods of time. If this happens, allow it to reach room temperature before use.

This projector is not intended for use in mainframe computer rooms as defined in the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

Transport the projector in a vendor-approved hard or soft case. Part numbers for these cases are listed on page 35.

If You Need Assistance

The first place to look for help is in this manual. Be sure to check the guidelines in "Troubleshooting" on page 29.

If this manual doesn't answer your question, call your In Focus dealer. You can also call In Focus Customer Service directly at **1-800-799-9911**. Call between 5 a.m. and 5 p.m. PST, Monday through Friday. In Europe, call In Focus in The Netherlands at **(31) 23-5540310**. In Singapore, call **(65) 740-6435**. Or, send us an e-mail at **techsupport@infocus.com**

Our World Wide Web address is **http://www.infocus.com**.

Warranty

This product is backed by a limited one-year warranty. The details of the warranty are printed at the back of this manual. Longer term warranties can be purchased from your In Focus dealer. Refer to page 36 for part numbers.

SETTING UP THE PROJECTOR

1 Place the projector on a flat surface.

- The projector must be within 10 feet (3 m) of your power source and within 6 feet (1.8 m) of your computer.
- If you want to project from behind a translucent screen, set up the projector behind your screen. See "Rear Projection" on page 23 to reverse the image.

2 Position the projector the desired distance from the screen.

- The distance from the lens of the projector to the screen determines the size of the projected image. Figure 3 shows three projected image sizes. For more information about image size, see "Projected Image Size" on page 43.

3 Make sure the projector and your computer are turned off.

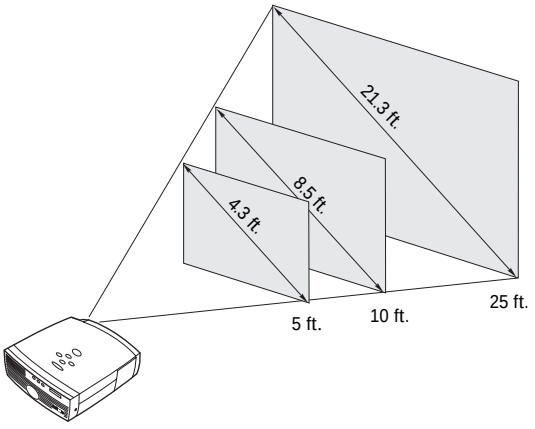

FIGURE 3

Projected image size

***NOTE**: Before you continue, make sure the projector and your equipment are turned off. If you're connecting a computer, make sure the distance between it and the projector is 6 feet or less.*

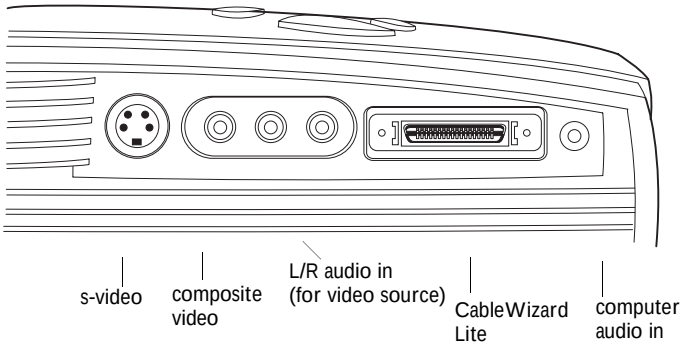

FIGURE 4

Connector panel

Connecting an IBM-Compatible Computer

1 Plug the end of the CableWizard Lite computer cable into the video connector on your computer.

2 Plug the end of the CableWizard Lite computer cable into the connector on the projector.

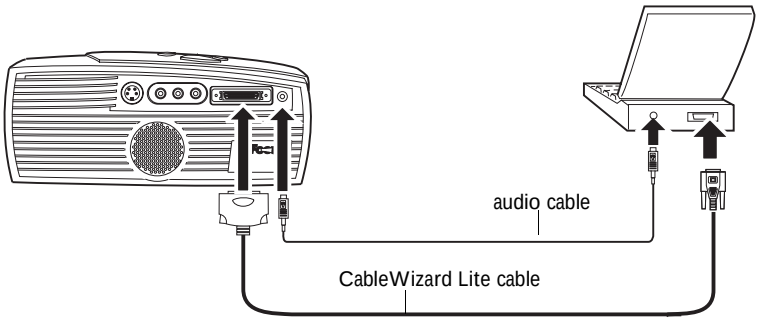

FIGURE 5

Connecting the computer cable to an IBM-compatible computer

Do you want to play your computer's audio on the projector?

1 Plug either end of the audio cable into the audio connector on your computer.

2 Plug the other end of the audio cable into the connector on the projector.

NOTE: *Many laptop computers do not automatically turn on their external video port when a secondary display device such as a projector is connected. Refer to your computer manual for the command that activates the external video port. Activation commands for some laptop computers are listed in the Appendix of this manual on page 37.*

NOTE: *If you are connecting a desktop computer and want to view your presentation on your monitor, purchase the optional CableWizard.*

NOTE: *If you want mouse control, purchase the optional CableWizard and remote.*

Connecting a Macintosh Computer

1 Plug the end of the CableWizard Lite computer cable into the In Focus-supplied Mac adaptor.

2 Plug the CableWizard Lite / Mac adaptor into the video connector on your computer (or the Apple video-out cable or monitor adapter, if needed).

3 Plug the end of the CableWizard Lite computer cable into the connector on the projector.

4 If you want the projector display to be the same as the PowerBook's screen display, turn on video mirroring (called SimulScan in newer PowerBooks). See "Using Video Mirroring with a PowerBook Computer" on page 42 for additional information.

NOTE: *Some PowerBooks require the Apple-supplied video-out cable or monitor adapter for external video. Connect it between the PowerBook and the CableWizard Lite computer cable/Mac adaptor as shown in Figure 6.*

NOTE: *If you are connecting a desktop computer and want to view your presentation on your monitor, purchase the optional CableWizard.*

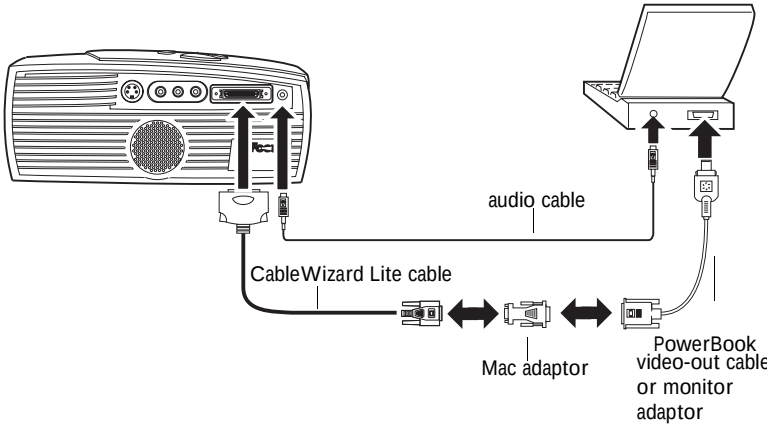

FIGURE 6

Connecting the CableWizard Lite computer cable to a Macintosh

NOTE: *If you want mouse control, purchase the optional CableWizard and remote.*

Do you want to play your computer's audio on the projector?

1 Plug either end of the audio cable into the audio connector on your computer.

2 Plug the other end of the audio cable into the connector on the projector.

Connecting a Video Player

1. If your video player uses a round, one-prong composite video connector, you'll need only the A/V cable that shipped with the projector.

   - If your video player uses a round, four-prong S-video connector, you'll need an S-video cable in addition to the A/V cable. The S-video cable is sold separately. (See "Accessories" on page 35.)

2. Plug the A/V cable's yellow connector into the "video-out" port on your video player (Figure 7). This port may be labeled "To Monitor."

   - If you're using an S-video cable, connect it to the "s-video out" connector on the video player (Figure 8).

3. Plug the other yellow connector into the composite connector on the back of the projector.

   - If you're using S-video, plug the other end of the cable into the "s-video" connector on the projector (Figure 8).

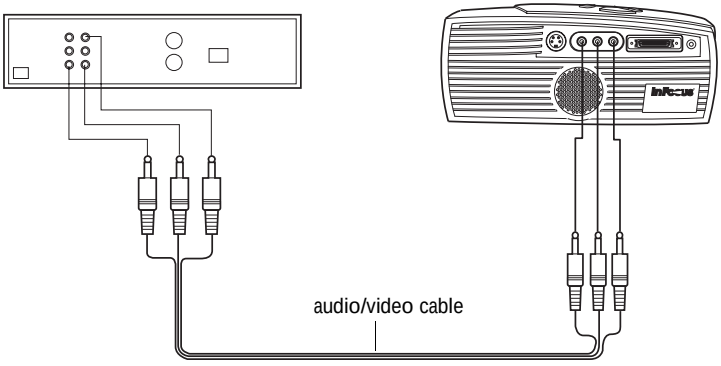

FIGURE 7

Connecting the projector to a video player using the standard A/V cable (with composite video connector)

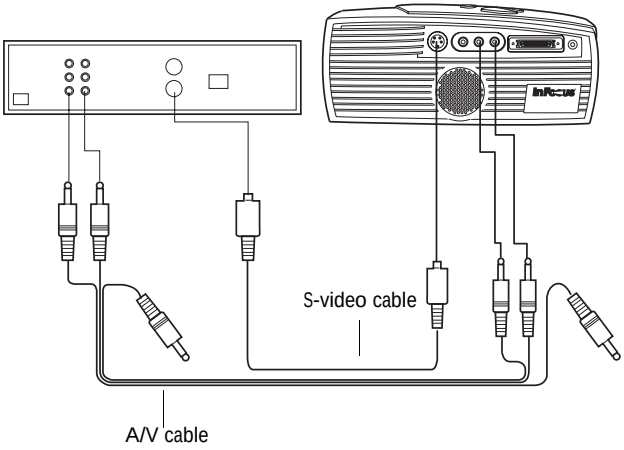

FIGURE 8

Connecting the projector to a video player using an S-video cable and the audio connectors on the standard A/V cable

4 Plug the A/V cable's white connector into the left "audio out" port on your video player. Plug the cable's red connector into the right "audio out" port on the video player (Figure 7 and Figure 8).

- If you're using an S-video cable, the yellow connectors on the A/V cable remain unused (Figure 8).

5 Plug the A/V cable's other white and red connectors to the left and right "audio in" ports on the projector.

CAUTION: *Your video player may also have a "Video Out" port for a coaxial cable connection. DO NOT use this to connect to the projector.*

The projector is compatible with these major broadcast video standards: NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, and SECAM. It automatically adjusts to optimize its performance for the incoming video. The input signals for SECAM, PAL-M, and PAL-N video are similar to other video signals and cannot be automatically detected, therefore they must be chosen manually. See "Video Standard" on page 22 for details.

Powering up the Projector and Adjusting the Image

1 Remove the lens cap.

2 Plug the power cord into the side of the projector, then plug it into your electrical outlet. A surge-protected power strip is recommended if power surges are common in your area.

3 Turn on the projector.

- The In Focus startup screen displays and the Power LED on top of the projector lights.

4 If you connected a video player, turn it on.

- The video image should display on the projection screen. If a computer source is active, press the **source** button on the keypad (page 15) to display your video image. You can select a default source to determine which source the projector examines first during power-up for active video; see "Default Source" on page 23.
- Use the **volume** buttons to adjust the volume.

5 Turn on your computer.

- The computer image should display on the projection screen. (If a video source is active, press the **source** button to display your computer's image.)
- If necessary, make adjustments to the image from the projector's on-screen menus. To open the menus, press the **menu** button on the keypad, then select the Display or Image menu. For more information about the menus, see page 16.

***NOTE**: Always use the power cord that shipped with the projector.*

***NOTE**: With some computers, the order in which you power up the equipment is very important. Most computers should be turned on last, after all other peripherals have been turned on. Refer to your computer's documentation to determine the correct order.*

Turning Off the Projector

If you want to turn off the projector for a short period of time, press the **standby** button on the keypad. This blanks the screen for fifteen minutes, but keeps the projector running. After 15 minutes, the lamp goes out (the projector keeps running). To exit standby mode, press the **standby** button again. (It takes several seconds for the projection lamp to reach full power and project the image again.)

To completely power off the projector, press the "O" side of the power switch on the side of the projector. If you want to turn the projector back on immediately, you must allow about a minute for the lamp to cool. The lamp won't light if it's too hot.

CAUTION: *When you disconnect the projector after you have switched it off, always remove the power cord from the electrical outlet first, then remove it from the projector.*

USING THE PROJECTOR

This section describes how to use and make adjustments to the projector. It also provides a reference to the keypad buttons and the options available from the on-screen menus.

Basic Image Adjustment

1. Make sure you have powered up your equipment in the right order (page 11).
2. If the image doesn't display completely, adjust the height of the projector (page 14) or center the image by adjusting its horizontal or vertical position (page 21). Be sure the projector is at a 90 degree angle to the screen.
3. If the image is out of focus, rotate the focus lens (page 13).
4. If the image appears to shimmer or if it has blurry vertical bars after you have adjusted the focus, turn Auto Image (page 20) off and then back on to reset the automatic sync and tracking. If that doesn't clear up the image, turn Auto Image off adjust the sync (page 21) and / or the tracking (page 21) manually.
5. If the colors don't look right, adjust the brightness (page 17).

Adjusting the Projector

To focus the image, rotate the focus ring (Figure 9) until the image is clear.

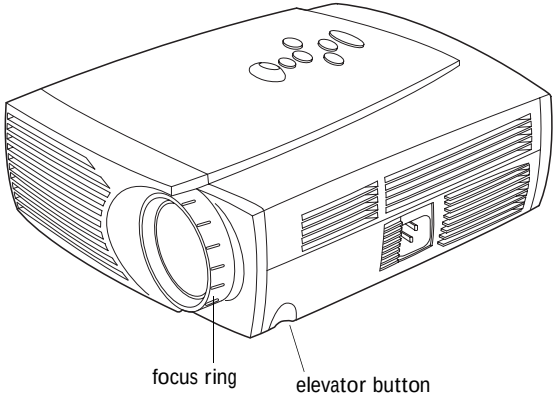

FIGURE 9

Focus ring and elevator button

***NOTE**: In Focus has created a software program called In Focus Presents that automatically optimizes your computer's display when used with any In Focus projector. This free program is included with every projector and available for download from our website at* www.infocus.com.

The projector is equipped with a self-locking, quick-release elevator foot and button (Figure 10).

To raise the projector:

1. Press and hold the elevator button (Figure 9).
2. Raise the projector to the height you want, then release the button to lock the elevator foot into position.

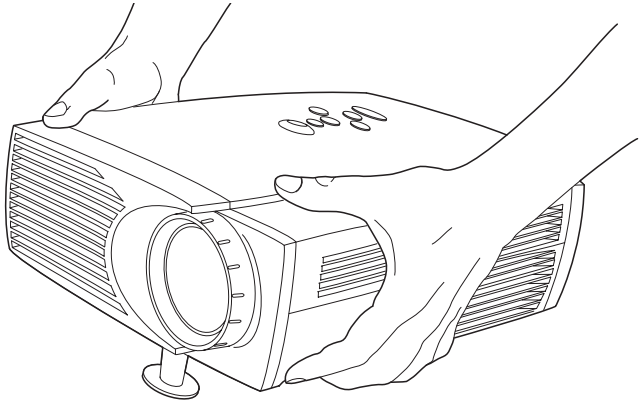

FIGURE 10

Adjusting the height of the projector

To lower the projector:

1. Press the elevator button.
2. Lower the projector.

Using the Keypad Buttons

The keypad is lit orange when the projector is on and lit green while the menus are displayed. While the menus are displayed, the volume, source, and standby buttons act as navigation buttons. See “Using the On-Screen Menus” on page 16 for details.

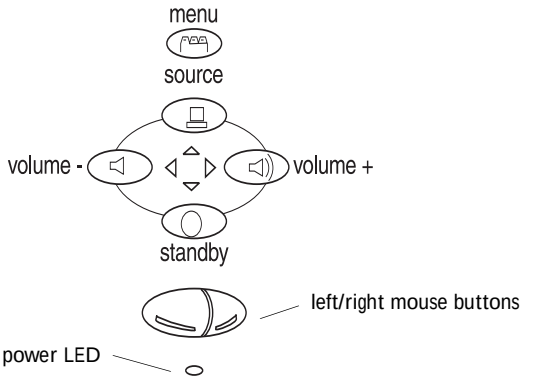

FIGURE 11

Keypad

Menu

Press **menu** to open the on-screen menus (the keypad lights green). Press **menu** again to close the menus. When you close the menus, the projector saves any changes you made. For more information about the on-screen menus, see page 16.

Source

When you have more than one source (computer or LiteShow Pro and video) connected to the projector, select between them by pressing the button.

Standby

When you press **standby**, the display and audio turn off and a blank screen is displayed for 15 minutes.

- If you press **standby** again within 15 minutes, the projector returns to normal operations immediately.
- If you press **standby** again after 15 minutes, there is about a 30 second delay before the lamp turns back on.
- If you don’t press **standby** again, the lamp turns off after 15 minutes.

NOTE: *LiteShow Pro is an optional presentation player. Contact your In Focus dealer for more information.*

Volume

- To increase the volume, press
- To decrease the volume, press

Volume adjustments are saved for each source you have connected.

Using the On-Screen Menus

The projector has four on-screen menus that allow you to make image adjustments and change a variety of settings. Most of these adjustments aren't available directly from the keypad.

To open the on-screen menus, press the **menu** button on the keypad. This changes the volume, source, and standby buttons on the keypad to menu navigation buttons (and illuminates the keypad green). Press the corresponding buttons to move the cursor up, down, left, or right. To select a menu, use these buttons to move the cursor to the tab for the menu you want, then click either mouse button. To change a menu setting, move the cursor to the setting you want to change using the navigation buttons, then use one of the two mouse buttons to make changes. Press **menu** again when you want to close the menus. All changes are saved when you close the menus.

The status bar at the top of the menu display indicates the source that is currently active (Computer or Video) and any peripherals that are connected. It also contains a lamp hour counter that starts at zero hours and counts each hour the lamp is in use. Change the bulb when the brightness is no longer acceptable. See "Replacing the Projection Lamp" on page 25 for details.

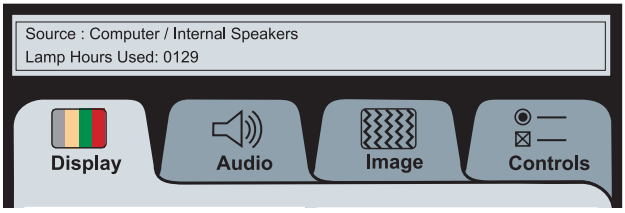

FIGURE 12

On-screen menu status bar

Display Menu Functions

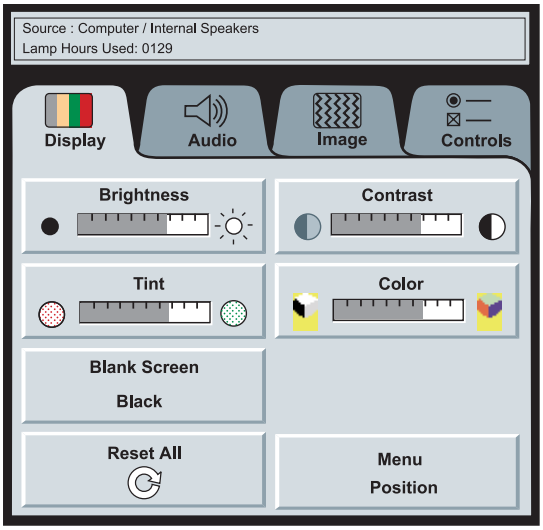

FIGURE 13

Display menu

Brightness

Adjusting the brightness changes the intensity of the image.

- Press the left mouse button to darken the image.
- Press the right mouse button to lighten the image.

Contrast

The contrast controls the degree of difference between the lightest and darkest parts of the picture. Adjusting the contrast changes the amount of black and white in the image.

- Press the left mouse button to decrease the contrast.
- Press the right mouse button to increase the contrast, making the blacks appear blacker and the whites appear whiter.

Tint

The **Tint** setting adjusts the red-green color balance in computer and NTSC video images.

- Press the left mouse button to increase the amount of green in the image.
- Press the right mouse button to increase the amount of red in the image.

Color

The **Color** setting adjusts a video image from black and white to fully saturated color.

- Press the left mouse button to decrease the amount of color in the image.
- Press the right mouse button to increase the amount of color in the image.

Blank Screen

Blank Screen determines what color (blue or black) is displayed when there is no active source. Click the button to toggle between the two options.

Reset All

Click either mouse button to reset all the options (except Language and Video Standard) in all the menus to their original settings.

Menu Position

This lets you move the menu to various locations on the screen, allowing you to view different parts of the image while making adjustments. The default position is the center of the screen. Click Menu Position to move the menu to the upper-left corner; click it again to move it to upper-right, then lower right, then lower left, then center again.

Audio Menu Functions

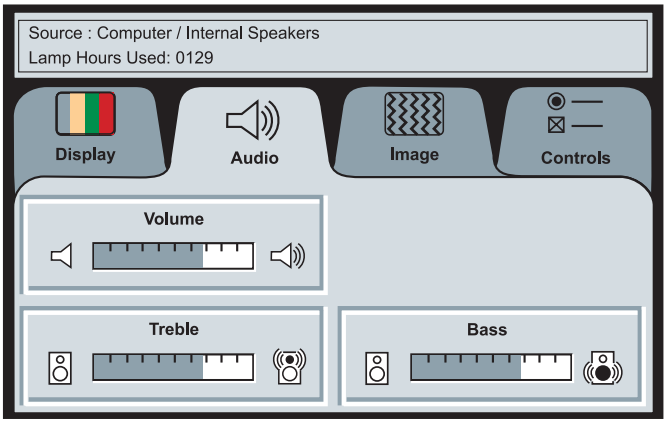

FIGURE 14

Audio menu

Volume

- Press the left mouse button to decrease the volume.
- Press the right mouse button to increase the volume.

Volume adjustments you make are saved for each source.

Treble

The **Treble** setting controls the higher frequencies of your audio source.

- Press the left mouse button to decrease the treble.
- Press the right mouse button to increase the treble.

Bass

The **Bass** setting controls the lower frequencies of your audio source.

- Press the left mouse button to decrease the bass.
- Press the right mouse button to increase the bass.

NOTE: *Changing the volume from the menu is the same as changing it using the keypad.*

Image Menu Functions

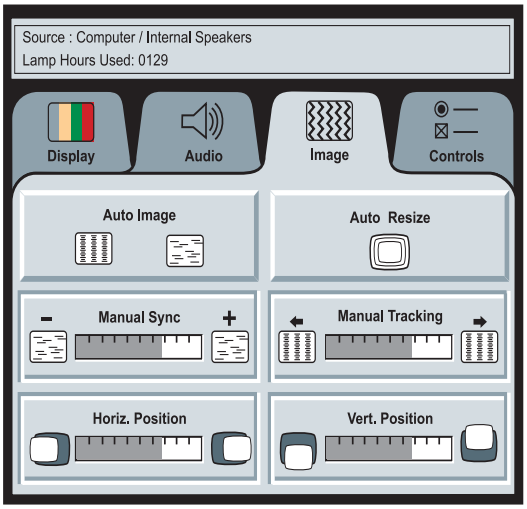

FIGURE 15

Image menu

NOTE: *Some screen savers interfere with the operation of Auto Image. If you're experiencing problems, try turning your screen saver off, then turning Auto Image off and back on.*

Auto Image

The projector automatically adjusts tracking, signal synchronization and vertical and horizontal position for most computers. If you want to adjust these features manually, you must turn off **Auto Image** first by clicking it. Remember, to generate the best quality image, set your computer to output 800 x 600 resolution.

Auto Resize

The **Auto Resize** setting is available only for computer-generated images. **Auto Resize** automatically resizes the image by scaling it up or down.

When **Auto Resize** is on, the projector makes the best fit of the image to the screen. If you turn **Auto Resize** off (by clicking it), the image may be either cropped or too small for the screen.

Manual Sync

The projector adjusts signal synchronization automatically for most computers. But if the projected computer image looks fuzzy or streaked, try turning **Auto Image** off then back on again. If the image is still unacceptable, try adjusting the signal synchronization manually:

1. Click the **Auto Image** button to turn Auto Image off.
2. Press the left or right mouse buttons repeatedly until the image is sharp and free of streaks.

Manual Tracking

The tracking function adjusts the projector to match the video signal from your computer. The projector usually adjusts the tracking automatically when you connect your computer. However, if the display shows evenly spaced, fuzzy, vertical lines or if the projected image is too wide or too narrow for the screen, try turning **Auto Image** off then back on again. If the image is still unacceptable, try adjusting the tracking manually as described below.

1. Click the **Auto Image** button to turn Auto Image off.
2. Press the left or right mouse buttons repeatedly until the fuzzy vertical bars are gone.

Horiz. Position

Follow these steps to manually adjust the horizontal position.

1. Click the **Auto Image** button to turn Auto Image off.
2. Press the left mouse button to move the image right; press the right mouse button to move the image left.

Positioning adjustments are saved when you power off the projector.

Vert. Position

Follow these steps to manually adjust the vertical position.

1. Click the **Auto Image** button to turn Auto Image off.
2. Press the left mouse button to move the image down; press the right mouse button to move the image up.

Positioning adjustments are saved when you power off the projector.

NOTE: *The* ***Manual Sync****,* ***Manual Tracking****,* ***Horiz. Position*** *and* ***Vert. Position*** *buttons are available only for computer sources. The projector sets these options automatically for a video source.*

Controls Menu Functions

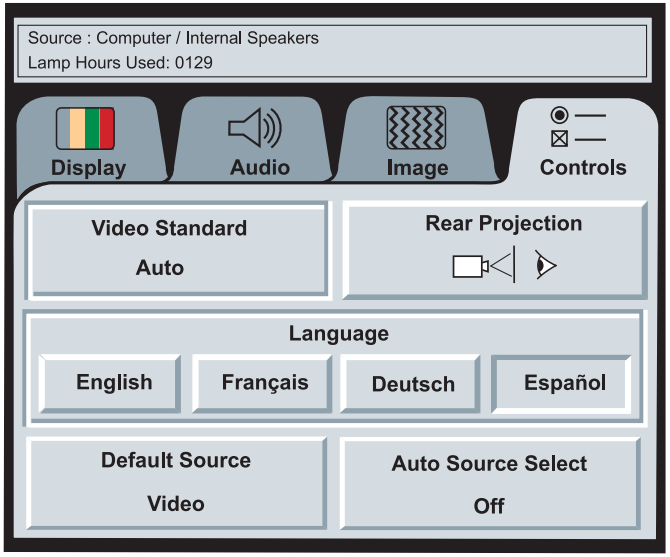

FIGURE 16

Controls menu

NOTE: *If you already know the video standard used in your geographical area, it's often best to manually select it.*

Video Standard

When **Auto** is on, the projector attempts to pick the video standard (NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, or SECAM) automatically based on the input signal it receives. (The video standard options may vary depending on your region of the world.) The input signals for SECAM, PAL-M, and PAL-N video cannot be automatically detected, therefore they must be chosen manually. If the projector is unable to detect the standard, the colors might not look right or the image might appear "torn." If this happens, manually select a video standard by clicking the button and cycling through the standards.

Language

You can display the on-screen menus in English, French, German, and Spanish. The default is English.

- Click the button for the language you want. The menus redraw immediately.

Rear Projection

When you select **Rear Projection**, the projector reverses the image so you can project from behind a translucent screen.

Default Source

Default Source toggles between Computer and Video. This determines which source the projector checks first during power-up for active video. Click the button to toggle between the options.

Auto Source Select

This setting toggles between On and Off. When this feature is Off, the projector defaults to the source selected in Default Source. To display another source, you must manually select one by pressing the **computer** or **video** button on the keypad. When this feature is On, the projector automatically finds the active source, checking the default source first. Click the button to toggle between the options.

MAINTENANCE & TROUBLESHOOTING

This section describes how to:

- clean the lens
- replace the projection lamp
- use the Kensington lock feature
- troubleshoot the projector

Cleaning the Lens

Follow these steps to clean the projection lens:

1. Apply a non-abrasive camera lens cleaner to a soft, dry cloth.
   - Avoid using an excessive amount of cleaner.
   - Abrasive cleaners, solvents or other harsh chemicals might scratch the lens.
2. Lightly wipe the cleaning cloth over the lens.
3. If you don't intend to use the projector immediately, replace the lens cap.

Replacing the Projection Lamp

The lamp hour counter on the status bar at the top of the menus counts the number of hours the lamp has been in use. The LP 420 uses a metal halide bulb. These types of bulbs deteriorate over time. Replace the lamp when the brightness is no longer acceptable. You can order new lamp modules from your In Focus dealer. See "Accessories" on page 35 for information.

Follow these steps to replace the projection lamp:

1. Turn off the projector and unplug the power cord.
2. Wait 30 minutes to allow it to cool thoroughly.
3. Place the projector on its side, then insert a small screwdriver or other flat object into the tabs on the lamp module door (Figure 17).

WARNING: *To avoid burns, allow the projector to cool for at least 30 minutes before you open the lamp module door. Never extract the lamp module while the lamp is operating.*

4 Pull the lamp door up and remove it.

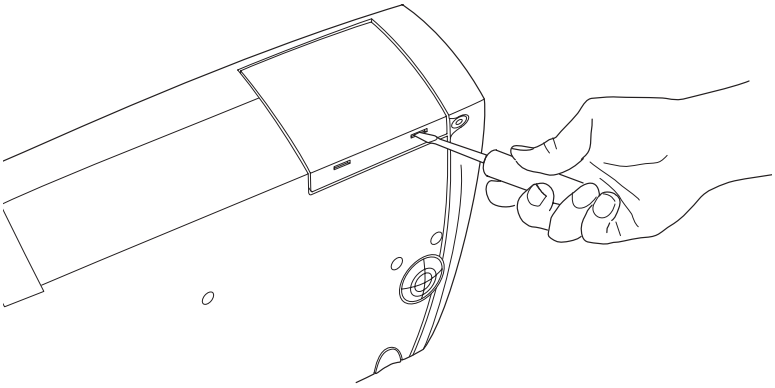

FIGURE 17

Removing the lamp door

CAUTION: *Never operate the projector with the lamp door open or removed. This disrupts the air flow and causes the projector to overheat.*

5 Loosen the two non-removable screws on the outside of the module.

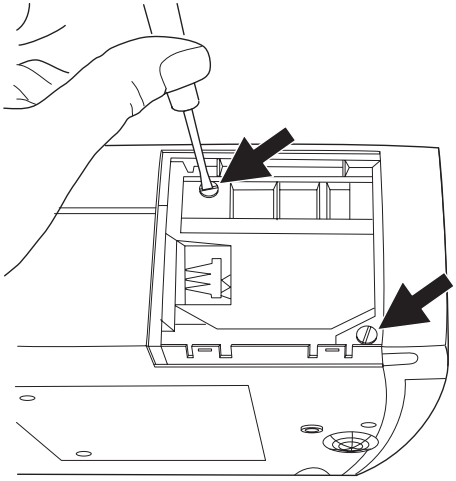

FIGURE 18

Loosening the screws on the lamp module

6 Slide the lamp connector to the right to disconnect it from the projector (Figure 19).

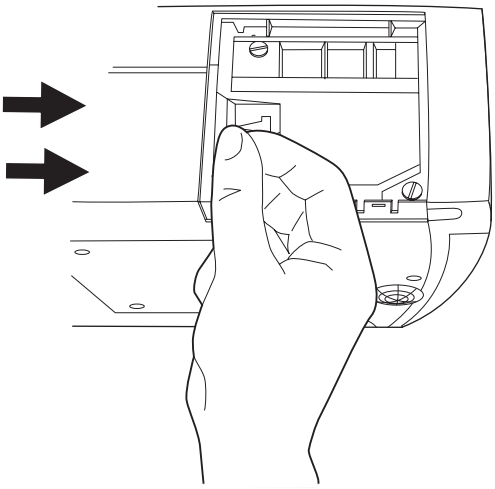

FIGURE 19

Sliding the lamp connector

7 Remove the module (Figure 20).

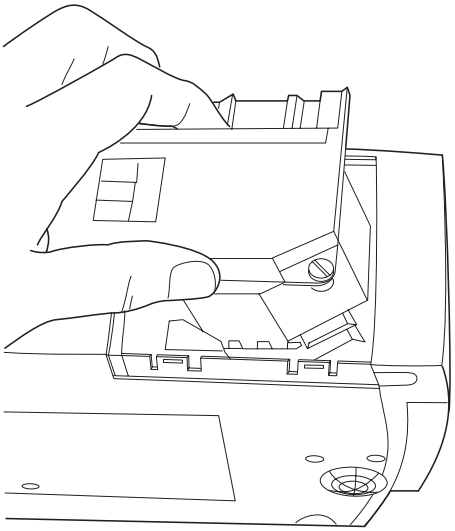

FIGURE 20

Removing the lamp module

WARNING: *Do not drop the lamp module or touch the glass bulb! The glass may shatter and cause injury.*

8 Align the new lamp module in the correct direction.

9 Gently push the module in as far as it goes.

10 Tighten the screws on the outside of the module.

11 Slide the lamp connector to the left to re-attach it.

12 Insert the tabs at the top of the lamp door into the projector and press the lamp door into place.

13 Plug in the power cord and turn the projector back on.

14 To reset the lamp hour counter in the Status bar, press and hold the left mouse button, then press the menu button (while still holding down the mouse button) for 5 seconds. Verify that the counter was reset by pressing the menu button and viewing the counter.

Using the Kensington Lock

The projector has a Kensington Security Standard connector for use with a Kensington MicroSaver Security System (Figure 21). Refer to the information that came with the Kensington System for instructions on how to use it to secure the projector.

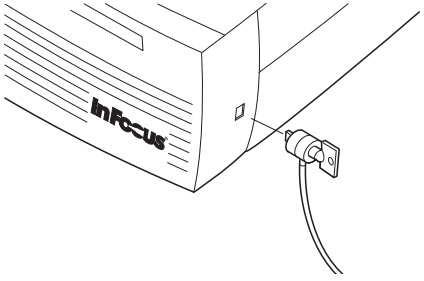

FIGURE 21

Installing the Kensington lock

Troubleshooting

Problem: Nothing on projection screen

- Make sure that the power cord is properly connected to a functional AC electrical outlet. Make sure that the power cord is also properly connected to the projector.
- If the projector is plugged into a power strip, make sure the power strip is turned on.
- Make sure you have removed the lens cap on the projection lens at the front of the projector.
- Make sure the projector is switched on.
- Check the projector's lamp to ensure that it is securely connected in the lamp module. See "Replacing the Projection Lamp" on page 25.
- Make sure that the cables do not have any bent pins.

Problem: Color or text not being projected

- You might need to adjust the brightness up or down until the text is visible. Refer to "Brightness" on page 17 for more information.

Problem: The screen resolution is not right

- Make sure the computer's video card is set for a resolution of no greater than 1024x768. A resolution of 800x600 yields the highest quality image.

Problem: Image isn't centered on the screen

- Reposition the image. Refer to "Horiz. Position" on page 21 and "Vert. Position" on page 21.
- Be sure the projector is at a 90 degree angle to the screen.

Problem: Only the start-up screen displays

- Verify that the cables are connected correctly. See page 7 through page 9 for connection procedures.
- Verify that the proper input source is connected. See "Source" on page 15.

- You might need to turn everything off and power up the equipment again in the proper order. Refer to your computer's documentation to determine the correct order.
- Make sure your laptop's external video port is turned on. See the "Portable and Laptop Activation Chart" on page 37 or your computer's manual for details.
- Make sure your computer's video board is installed and configured correctly.

If you're using Windows 3.x:

1. In the Windows Program Manager, double-click the Windows Setup icon in the Main program group.
2. Verify that the Display setting is 1024x768 or less.

If you're using Windows 95:

1. Open "My Computer" icon, the Control Panel folder and then the Display icon.
2. Click the Settings tab.
3. Verify that the Desktop area is set to 1024x768 or less.

Also check the following:

- Does your computer have a compatible video board? The projector isn't CGA or EGA compatible.
- Is your computer's video port activated? This is especially true for laptop computers. See "Portable and Laptop Activation Chart" on page 37.

Problem: Image is too wide or narrow for screen

- You might need to manually adjust the tracking to reduce or enlarge the projected image. Refer to "Manual Tracking" on page 21.
- Adjust the resolution of your video card if it's greater than 1024x768 pixels.

Problem: Image is out of focus

- Turn the projection lens to focus the image.
- Make sure the projection screen is at least 5 feet (1.5 m) from the projector.
- Check the projection lens to see if it needs cleaning.

Problem: Image and menus are reversed left to right

- Rear projection mode is probably turned on. Turn Rear Projection off in the Controls menu. The image should immediately return to forward projection. See "Rear Projection" on page 23.

Problem: the projector displays vertical lines, "bleeding" or spots

- Adjust the brightness. See "Brightness" on page 17.
- Check the projection lens to see if it needs cleaning.

Problem: no sound

- Adjust volume.
- Verify audio/input connections.
- Adjust audio source.

Problem: Image is "noisy" or streaked

Try these steps in this order.

1. Deactivate the screen saver on your computer.
2. Turn **Auto Image** off and then back on again. See "Auto Image" on page 20.
3. Adjust the synchronization and tracking manually to find an optimal setting. See "Manual Sync" on page 21 and "Manual Tracking" on page 21.

- The problem could be with your computer's video card. If possible, connect a different computer.

Problem: Projected colors don't match the computer or video player's colors

- Adjust the brightness, tint and/or contrast from the Display menu. Just as there are differences in the displays of different monitors, there are often differences between the computer image and the projected image. See "Brightness" on page 17, "Tint" on page 17 and "Contrast" on page 17.

Problem: Lamp seems to be getting dimmer

- The lamp begins to lose brightness when it has been in use for a long time. Replace the lamp as described in "Replacing the Projection Lamp" on page 25.

Problem: Lamp shuts off

- A minor power surge may cause the lamp to shut off. Turn the projector off, wait at least a minute, then turn it back on.

Before calling your dealer or In Focus Technical Support for assistance, please have the following information available:

- the projector's serial number (located on the bottom label)
- the resolution of your computer.

Call In Focus Technical Support at **1-800-799-9911** between 5 a.m. and 5 p.m. PST, Monday through Friday.

APPENDIX

Specifications

The LP 420 must be operated and stored within the temperature and humidity ranges specified.

Temperature	
Operating	50 to 104° F (10 to 40° C)
Non-operating	-4 to 158° F (-20 to 70° C)

Humidity	
Operating and non-oper.	5% to 95% relative humidity, non-condensing

Dimensions
4.0 x 9.3 x 11.8 inches (10.3 x 23.8 x 30.3 cm)

Weight
6.8 lbs. (3.1 kg) unpacked

Altitude	
Operating	0 to 10,000 feet (3,048 meters)
Non-operating	0 to 40,000 feet (12,192 meters)

Optics	
Focus Range	5.0 - 16 feet (1.5-5 m)

Lamp	
Type	270-watt metal halide

Input Power Requirements
100/120V, 6.0/6.0A, 50/60 Hz 230V, 3.0A, 50 Hz

Video Audio Input

Input Impedance	5K ohm DC coupled
Maximum Input Voltage	$(L_{IN} + R_{IN})_{PEAK} < 4.5$ V for THD ≤ 0.3% L_{IN} or $R_{IN} < 2.0$ Vrms for THD ≤ 0.3%
Sensitivity	100 mV at 1 KHz for 88 dB SPL at 1 meter
Connector Type	RCA jack

Computer Audio Input

Input Impedance	10K ohm nominal, AC coupled
Maximum Input Voltage	$(L_{IN} + R_{IN})_{PEAK} < 4.5$ V for THD ≤ 0.3% L_{IN} or $R_{IN} < 2.0$ Vrms for THD ≤ 0.3%
Sensitivity	100 mV at 1 KHz for 88 dB SPL at 1 meter
Connector Type	3.5 mm (1/8 inch) stereo phone jack

Accessories

Standard Accessories (ship with the projector)	Part Number
LP 420 Quick Start card	009-0314-xx
LP 420 User's Guide	010-0140-xx
Soft Case	110-0190-xx
Shipping Box	110-0186-xx
CableWizard Lite computer cable 6.5 ft (2 m)	SP-CW2LITE
Macintosh adaptor	515-0045-xx
Audio Cable 6 ft (1.8 m)	210-0118-xx
Projection Lamp Module	SP-LAMP-LP4
Lens Cap	505-0235-xx
Audio/Video Cable	210-0053-xx
Online User's Guide CD-ROM	010-0116-xx

Power Cords (one ships with projector, type depends on country)

North American Power Cord	210-0023-xx
Australian Power Cord	210-0027-xx
UK Power Cord	210-0028-xx
European Power Cord	210-0029-xx
Danish Power Cord	210-0030-xx
Swiss Power Cord	210-0031-xx

NOTE: *Use only In Focus-approved accessories. Other products have not been tested with the projector.*

Optional Accessories

Personal Plus Accessory Pack, includes:	SP-PP-LP4
Deluxe Soft Case (CA-C132)	
CableWizard 2 (SP-CW2)	
2-button remote (HW-EXREM)	
Deluxe Soft Case	CA-C132
ATA Travel Case	CA-C134
Executive Leather Case	CA-C133
CableWizard 2	SP-CW2
CableWizard Extension Cable, non-plenum rated, 60.7 ft (18.5 m)	SP-CW2EXT
CableWizard Extension Cable, plenum-rated, 60.7 ft (18.5m)	SP-CW2EXTP
2-button remote	HW-EXREM
Full-Feature Smart Remote Control	HW-SMART
LiteShow Pro Presentation Player	HW-LSPRO
LiteShow Pro Soft Case	CA-C131
32 MB Memory Upgrade	HW-MEM-LSP
Kensington MicroSaver Security System	SP-KENLOC
Tripod Mount	SP-TRIP-LP4
Portable Projector Stand	SP-STND
S-Video Cable	515-0027-xx
2nd Year Advantage Service Plan (1 year extension)	AS-LP4xx-12
3rd Year Advantage Service Plan (2 year extension)	AS-LP4xx-24

Portable and Laptop Activation Chart

Many laptop computers do not automatically turn on their external video port when a secondary display device such as a projector is connected. Activation commands for some laptop computers are listed in the following table. (If your computer is not listed or the given command does not work, refer to the computer's documentation for the appropriate command.) On some laptops, the activation function key is labeled with an icon, for example or the text CRT/LCD.

Computer	Key command to activate port	Key command to de-activate port
Acer	Ctrl-Alt-Esc (for setup)	Ctrl-Alt-Esc (for setup)
AST* **	FN-D or Ctrl-D	FN-D or Ctrl-D
	Ctrl-FN-D	Ctrl-FN-D
	FN-F5	FN-F5
	type from A:/IVGA/CRT	type from A:/IVGA/CRT
	FN-F12	FN-F12
AMS	FN-F2	FN-F2
AMT	setup screen	setup screen
AT&T	FN-F3 FN-F6	FN-F3 FN-F6
Advanced Logic Research	Ctrl-Alt-V	Ctrl-Alt-V
Altima	Shift-Ctrl-Alt-C	Shift-Ctrl-Alt-L
	setup VGA/ Conf.Simulscan	setup VGA/ Conf.Simulscan
Ambra**	FN-F12	FN-F12
	FN-F5	FN-F5
	F2/Choose Option/F5	F2/Choose Option/F5
Amrel* **	setup menu	setup menu
	Shift-Ctrl-D	Shift-Ctrl-D
Apple	see Mac Portable and Mac PowerBook	
Aspen	automatic	automatic

NOTE: *Often, pressing the key commands once activates the external video port, pressing it again activates both the external and internal ports, and pressing it a third time activates the internal port. Refer to your computer's documentation for details on your specific model.*

Computer	Key command to activate port	Key command to de-activate port
Austin	Ctrl-Alt-comma	Ctrl-Alt-comma
Award	FN-F6	FN-F6
BCC*	automatic	reboot computer
Bondwell	LCD or CRT options after bootup	reboot for LCD or CRT options to appear
Chaplet**	setup screen	setup screen
	FN-F6	FN-F6
	FN-F4	FN-F4
Chembook	FN-F6	FN-F6
Commax	Ctrl-Alt-#6	Ctrl-Alt-#5
Compaq* **	Ctrl-Alt-<	Ctrl-Alt->
	FN-F4	FN-F4
	automatic	automatic
	mode/? (for setup option)	mode/? (for setup option)
Compuadd* **	automatic	automatic
	Alt-F for screen setup option	Alt-F for screen setup option
Data General	Ctrl-Alt-Command	Ctrl-Alt-Command
Data General Walkabout	2 CRT/X at DOS prompt	reboot
Datavue	Ctrl-Shift-M	Ctrl-Shift-M
DEC**	FN-F5	FN-F5
	FN-F4	FN-F4
Dell**	Ctrl-Alt-<	Ctrl-Alt->
	Ctrl-Alt-F10	Ctrl-Alt-F10
	FN-F8 (CRT/LCD)	FN-F8
	FN-D	FN-D
	FN-F12	FN-F12
Digital*	automatic	reboot
	FN-F2	FN-F2
Dolch	dip switch to CRT	dip switch to LCD
Epson	dip switch to CRT	dip switch to LCD

Computer	Key command to activate port	Key command to de-activate port
Everex*	setup screen option	setup screen option
For-A	Ctrl-Alt-Shift-C	Ctrl-Shift-Alt-L
Fujitsu	FN-F10	
Gateway	FN-F3 FN-F1/FN-F1 again simultaneous	FN-F3 FN-F1
Grid* **	FN-F2, choose auto or simultaneous	FN-F2
	Ctrl-Alt-Tab	Ctrl-Alt-Tab
Hitachi	FN-F7	FN-F7
Honeywell	FN-F10	FN-F10
Hyundai	setup screen option	setup screen option
IBM 970*	automatic	warm reboot
IBM ThinkPad**	reboot, enter setup menu	FN-F2
	FN-F7, select choice from setup menu	
	FN-F1, select choice	
	FN-F5, select choice	
	PS/2 SC select choice (CRT, LCD, etc.)	
Infotel	FN-F12	FN-F12
Kaypro	boot up, monitor plugged in	unplug monitor
Kris Tech	FN-F8	FN-F8
Leading Edge	FN-T	FN-T
Mac Portable 100	no video port: not compatible	
Mac PowerBook		
140, 145, 150, 170	no video port: requires a 3rd-party interface	
160, 165, 180, 520, 540, 5300	Control Panel folder, PowerBook Display folder; Activate Video Mirroring	warm reboot
210, 230, 250, 270, 280, 2300	requires Apple Docking Station or Mini Dock	

Computer	Key command to activate port	Key command to de-activate port
Magitronic	FN-F4	FN-F4
Mastersport	FN-F2	FN-F1
Micro Express*	automatic	warm reboot
Micron	FN-F2	FN-F2
Microslate*	automatic	warm reboot
Mitsubishi	SW2 On-Off-Off-Off	SW2 Off-On-On-On
NCR	setup screen option	setup screen option
NEC* **	setup screen option	setup screen option
	CRT at the DOS prompt	LCD at the DOS prompt
	FN-F3	FN-F3
Olivetti*	automatic	automatic
	FN-O/*	FN-O/*
Packard Bell* **	FN-F0	FN-F0
	Ctrl-Alt-<	Ctrl-Alt->
Panasonic	FN-F2	FN-F2
Prostar	Ctrl-Alt-S at bootup	Ctrl-Alt-S at bootup
Samsung*	setup screen option	setup screen option
Sanyo	setup screen option	setup screen option
Sharp	dip switch to CRT	dip switch to LCD
Sun SPARC-Dataview	Ctrl-Shift-M	Ctrl-Shift-M
Tandy**	Ctrl-Alt-Insert	Ctrl-Alt-Insert
	setup screen option	setup screen option
Tangent	FN-F5	FN-F5
Texas Instruments*	setup screen option	setup screen option
Top-Link* **	setup screen option	setup screen option
	FN-F6	FN-F6
Toshiba* **	Ctrl-Alt-End	Ctrl-Alt-Home
	FN-End	FN-Home
	FN-F5	FN-F5
	setup screen option	setup screen option

Computer	Key command to activate port	Key command to de-activate port
Twinhead*	FN-F7	FN-F7
	FN-F5	FN-F5
	Automatic	Automatic
WinBook	Ctrl-Alt-F10	Ctrl-Alt-F10
Wyse	software driven	software driven
Zenith**	FN-F10	FN-F10
	FN-F2	FN-F2
	FN-F1	FN-F1
Zeos**	Ctrl-Shift-D FN-F1	Ctrl-Shift-D FN-F1

* These manufacturers have models that automatically send video to the external CRT port when some type of display device is attached.

** These manufacturers offer more than one key command depending on the computer model.

Using Video Mirroring with a PowerBook Computer

When you turn video mirroring (called SimulScan in newer PowerBooks-see below) on, the projector displays the same information that appears on your PowerBook's built-in screen. When video mirroring is off, the projector acts like a separate display.

To turn on video mirroring for the first time:

1. Open the Monitors control panel; click on Monitor 2.
2. Set the number of colors you want.
3. Open the Control Strip; click on the monitor icon.
4. Select "Turn Video Mirroring On."

Now you can turn video mirroring on and off from the Control Strip without having to open the Monitors control panel again.

When using video mirroring and high color graphics such as slide shows, the projected image occasionally might turn black and white. If this happens, perform the following steps:

1. Turn off video mirroring.
2. Open the Monitors control panel.
3. Move the white menu bar to Monitor 2 to set the projector as the primary monitor.
4. Restart the PowerBook.

Using SimulScan

Some newer PowerBooks display images on an external monitor or projector differently than previous ones. When using SimulScan, the projector displays the same information that appears on your PowerBook

To select SimulScan:

1. Open the Control Panel, then double-click Monitors and Sound.
2. In the Resolution list, choose the SimulScan mode, then click OK.
3. If this changes your display settings, a dialog box appears. Click OK to confirm the change.

Projected Image Size

Use the chart and table to help you determine projected image sizes.

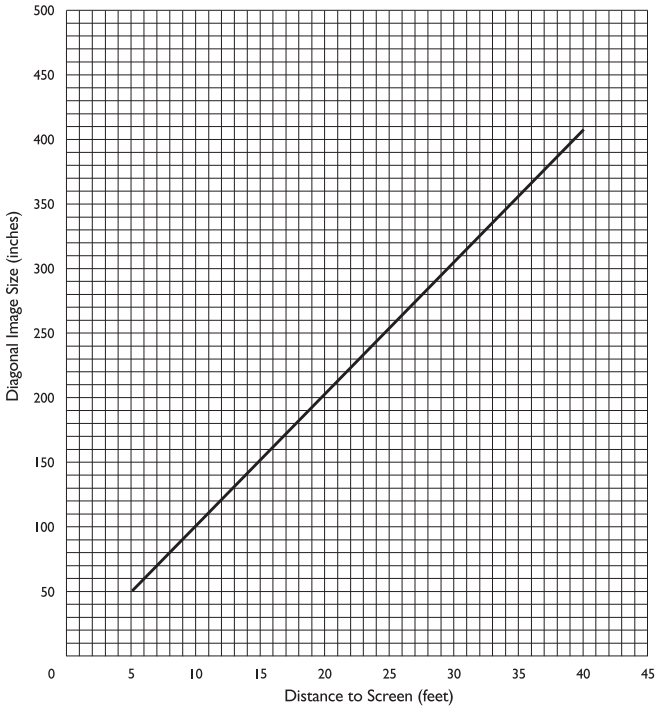

FIGURE 22

Projected image size

Table 1:
Image Size, Width and Height

Distance to Screen (feet)	Diagonal (inches)	Width (inches)	Height (inches)
5	51.0	40.8	30.6
10	102.0	81.6	61.2
15	153.0	122.4	91.8
20	204.0	163.2	122.4
25	255.3	204.0	153.0
30	306.0	244.8	183.6
35	357.0	285.6	214.2
40	408.0	326.4	244.8

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