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U S E R ' S   G U I D E



LapisColor  
Card

# LapisColor Card User's Manual

**FOCUS Enhancements, Inc.**



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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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## LapisColor Card User's Manual

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### ABOUT THIS MANUAL

This manual provides step-by-step instructions for installing your LapisColor Graphics Card in your Macintosh system as well as loading the software into your computer.

The manual is divided into two main sections:

- **Hardware Installation:** this section covers the installation of the LapisColor Graphics Card, providing detailed instructions and illustrations for all applicable Macintosh systems. The following Macintosh systems are covered: Macintosh SE/30, LC family, Color Classic or LC 520/575, IIsi, NuBus family, Performa 400/600, or compatible.
- **Software Installation:** this section outlines the installation of the LapisColor software Control Panel, covering its operation and features.

### PRODUCT REGISTRATION

To be kept informed of any software upgrades and special offers, please fill out and mail your warranty card immediately.

## UNPACKING

Before continuing please verify the following items are included in your LapisColor Card package:

- LapisColor Graphics Card
- LapisColor Software Disk\*
- LapisColor User Guide
- Warranty Registration Card
- DB-15 to VGA Adapter\*
- For PDS/30 boards only (SE/30 and IIsi):  
DB-15 Output Assembly includes connector, cable, faceplate, rivets, screws, nuts, and edge supports

## WHAT YOU NEED

In addition to the contents of your LapisColor package you will need the following items to set up the card:

- A color-capable Macintosh system with a PDS/30, LC PDS, or NuBus expansion slot
- Macintosh SE/30, LC Family, Color Classic or LC 520/575, any Mac-II model, Centris 650, Quadra-family, Performa 400 series, Performa 600, or compatible.
- System 7.0 or later (recommended) or;
- System 6.0.7 or later (Apple's 32-bit QuickDraw software is required)
- A color or gray scale monitor
- A monitor cable
- Anti-static wrist strap or work pad (optional)
- Phillips screwdriver (to unscrew security screw on modular Macs and install output assembly on the SE/30 and IIsi computers)
- For SE/30 users only:  
Macintosh case spreader  
8" T-15 Torx screwdriver  
Flat blade screwdriver (to remove programmer's switch)

\*Except LapisColor LC 2417/2421

## SAFETY CONSIDERATIONS

Before installing your LapisColor card, please take a moment to read over these brief safety precautions. While the hardware installation is discussed in a step-by-step to ensure a simple installation, it is important to understand these precautions.

### Important:

*Installing the LapisColor card in an SE/30 entails opening the Macintosh case and working around open electrical components. We recommend this installation be performed by an authorized Apple dealer. However, if you plan to install the board yourself, please note that the installation procedure does require some technical competence.*

The electronic parts of your computer and LapisColor card can be damaged by static electricity. To avoid problems, please follow these guidelines:

- Work in an environment free of static electricity. Work in an area without carpeting. Do not touch pets or other static-generating objects while working in your computer. Avoid wearing wool and synthetic clothing that could cause static build-up.
- In the text, you will see occasional references to a non-static surface. The best option is an anti-static mat specially made to eliminate static charge. If that isn't available, use a rubber, Formica, or wood surface. Avoid metal or cloth surfaces.
- Ground yourself to the Macintosh. Touch the metal frame of the computer frequently while you work in it. This will discharge possible static electricity. If you have one available, wear an anti-static wrist strap while installing the LapisColor card.
- Handle the LapisColor card by the edges only. Do not touch electronic components or connectors directly.



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## Quick Start

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If you have experience installing expansion cards in Macintosh systems, and would like to avoid the detailed installation sections in this manual, this section will give you quick step instructions.

- Open the Mac LC/NuBus/SE/30-IIsi system.
- Attach the video cable to the back panel of the Mac, and to the video card (SE/30/IIsi users only).
- Install the card in the expansion slot.
- Close the Mac.
- Connect the video monitor cable to the DB-15 video connector on the LapisColor Card.
- Refer to the Appendix in this manual which lists your LapisColor card model and monitor types for the "configure by key" chart. Hold the specified keys down on startup. At first the screen may "roll"- this is O.K. After a few seconds the Mac will restart a second time, and you will see a stable video image. Let go of the keys.
- Install the LapisColor software for more monitor timings to choose from if desired.\*
- Send in your warranty/registration card.

*\*Except LC 2417/2421 Users*

## HARDWARE INSTALLATION

This section provides detailed instructions and illustrations for installing the LapisColor card in your Macintosh system. Locate your Macintosh model in the outline below and refer to the page number for complete instructions:

Model	Page
SE/30 .....	7
IIx .....	12
LC/Performa/Quadra 605 .....	16
Color Classic and LC 520/575 .....	19
NuBus based machines .....	21
LC/Performa/Quadra 630 .....	24

**Note:**

*The list of systems above is current as of 3/95. If your Macintosh is a more recent model and is compatible with an LC or NuBus based expansion slot, the LapisColor should also be compatible. Please contact our Technical Support Department if you have additional questions.*

## INSTALLING INTO A MACINTOSH SE/30

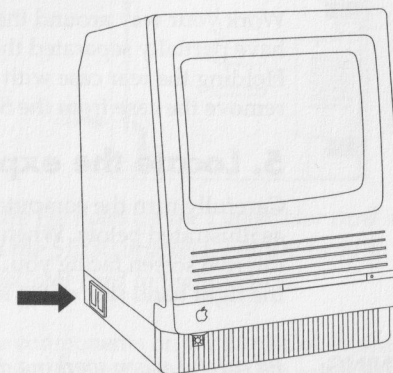
These instructions are for installing the LapisColor card into an SE/30 only. For all other Macintosh systems, refer to the outline on page 6 to locate instructions specific to your Macintosh system.

### 1. Make sure your Macintosh is turned off and unplug all cords and peripherals

If your computer is still on, select "Shut Down" from the Special menu in the Finder. Turn off the power switch on the back of the SE/30. Unplug the power cord and disconnect all peripheral cables from the back of the computer. Wait approximately five minutes to release any excess electrical charges.

### 2. If necessary, remove the programmer's switch

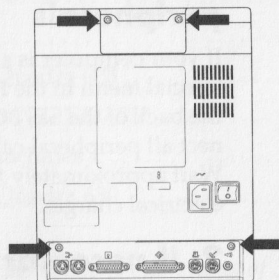
Your SE/30 may have a programmer's switch on the side of the case, as illustrated below. If this switch is present, carefully remove it by lifting its bottom edge with a flat-blade screwdriver.





### 3. Remove the Macintosh case screws

Place the SE/30 face down on a soft surface so the screen is facing downward. There are two case screws under the carrying handle and two at the bottom of the rear panel (see illustration below). Remove all four screws with a long-handle Torx T-15 screwdriver. The proper screwdriver is available from several third-party vendors at most Macintosh resellers.



### 4. Separate the case

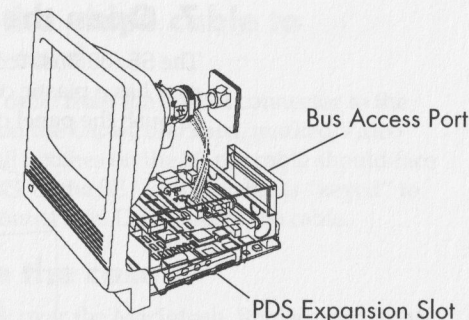
The two halves of the Macintosh case fit snugly together. To pry them apart, use a Macintosh case spreader. The Macintosh case spreader is available from several third-party vendors at most Macintosh resellers.

Work your way around the seam of the case until you have partially separated the case all the way around. Holding the rear case with both hands, pull straight up to remove the case from the SE/30.

### 5. Locate the expansion slot

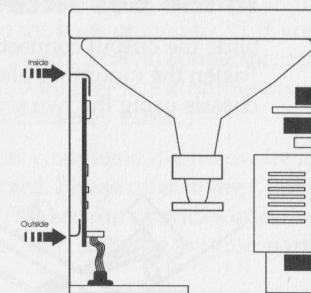
Carefully turn the computer back to an upright position, as illustrated below. When the SE/30 is upright with the internal screen facing you, the PDS/30 expansion slot is on the right hand side of the logic board.

**WARNING:** Be careful when working around the picture tube, its red anode wire, and the analog board on the side of the Macintosh. These parts contain highly sensitive components which can cause harm.



### 6. Connect the LapisColor card to the SE/30 expansion slot

There are two mounting brackets on the metal frame above the expansion slot. The LapisColor card goes on the inside of the front mounting bracket (i.e. the bracket closest to the internal screen) and on the outside of the back mounting bracket. The picture below illustrates this from a top-down view.



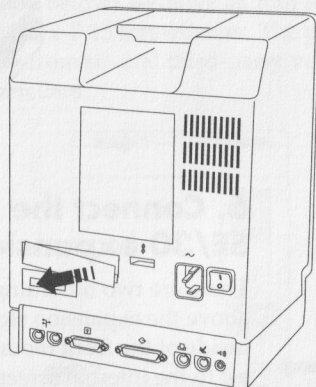
#### NOTE:

Make sure the holes on the LapisColor card align with the holes on the SE/30 brackets. Failure to do so may cause the LapisColor card to malfunction.

With the components on the LapisColor card facing inward, gently yet firmly insert the card into the SE/30 expansion slot. Use the provided plastic rivets to fasten the card securely.

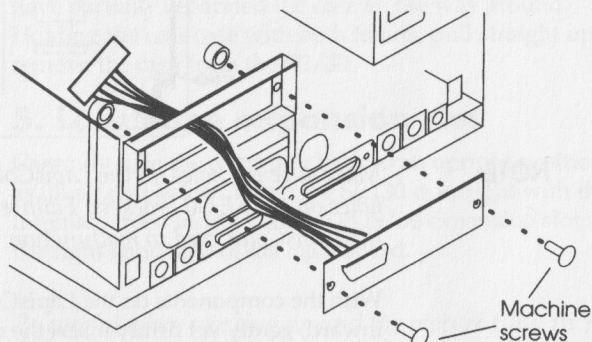
## 7. Open the SE/30 Bus Access Port

The SE/30 Bus Access Port in the rear panel of the SE/30 case has a plastic cover. From the inside, use your thumb to push the panel out.



## 8. Attach the DB-15 output connector to the Bus Access Port

Slide the output connector through the Bus Access Port. Fasten the mounting plate to the expansion port on the chassis using the two screws and nuts provided.



## 9. Connect the video cable to the display card

Attach the 10-pin cable from the output connector to the 10-pin connector on the LapisColor card, marked Video Out. The two small notches on the 10-pin cable should face out toward the back of the SE/30. The cable is "keyed" to ensure a proper connection. Do not force the cable.

## 10. Replace the case

Slide the case back over the Macintosh. Replace and tighten the case screws with the Torx screwdriver.

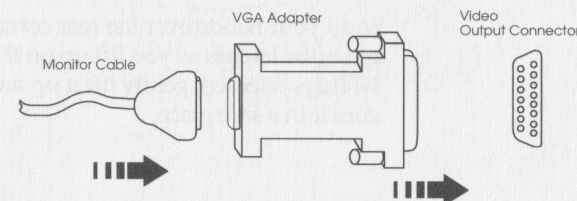
## 11. Re-connect all cords and peripherals

Plug in the power cord and re-connect all peripheral cords.

## 12. Connect your display cable to the SE/30

Plug your display cable from your monitor into the output connector on the back of the SE/30. If your monitor cable has a VGA (15-pin, 3 rows) connector, attach the provided DB-15 to VGA adapter to the output connector before attaching your display cable.

You have now completed the hardware installation of your LapisColor card. Please refer to the Configurations section on page 31. This section provides information on configuring the LapisColor software for your particular display.





## INSTALLING INTO A MACINTOSH IIsi

The Macintosh IIsi can use either a PDS/30 or NuBus type of LapisColor card. We recommend you use a PDS/30 version of the board as it runs faster and the 030 Direct Slot card adapter is less expensive than its NuBus counterpart. The instructions below assume you have the PDS/30 version of the LapisColor and have purchased the required Direct Slot Adapter. If you are installing a NuBus card into the IIsi, please refer to the Macintosh IIsi Owner's Guide for instructions.

### 1. Make sure your Macintosh is turned off and unplug all cords and peripherals

If your computer is still on, select "Shut Down" from the Special menu in the Finder. Unplug the power cord and disconnect all peripheral cables from the back of the computer. Wait approximately five minutes to release any excess voltage charges.

### 2. If necessary, remove the security screw

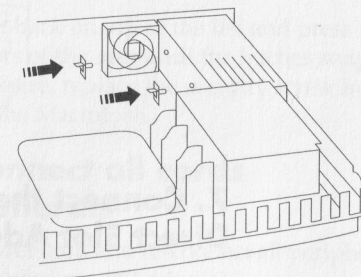
Your IIsi may have a small security screw located at the top center of the rear panel of the computer (it is used to hold the lid of the computer in place). Using a phillips screwdriver loosen and remove the screw.

### 3. Remove the lid from the computer

Wrap your hands over the rear corners of the IIsi and pull up on the latches as you lift up on the back of the lid. Once the lid is released, gently lift it up and toward you and store it in a safe place.

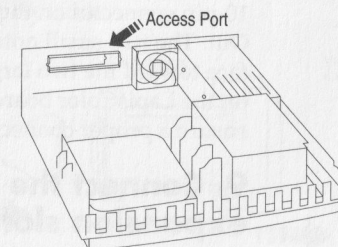
### 4. Attach the provided plastic edge supports to the power supply

If present, remove the Apple card bracket from the power supply (most IIsi's do not have this bracket). Included with your LapisColor card are two plastic edge supports with adhesive backings to hold the card in place. With the adhesive exposed, insert the two holes in the power supply. Make sure both supports are horizontal before you attach them, as illustrated below.



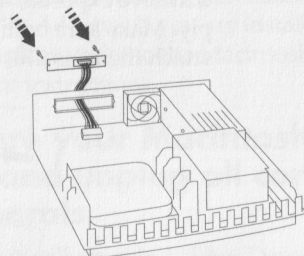
### 5. Open the IIsi Bus Access Port

The IIsi Bus Access Port in the rear panel of the IIsi case has a plastic cover. From the inside, use your thumb to push the panel out.



## 6. Attach the DB-15 output connector to the Bus Access Port

From the outside of the IIsi, slide the output connector through the Bus Access Port and fasten the mounting plate to the expansion port on the chassis using the two screws and nuts provided.



## 7. Connect the LapisColor card to the Direct Slot Adapter

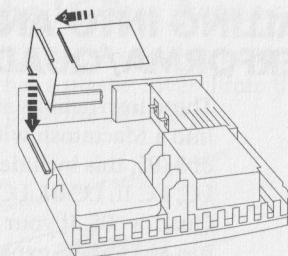
Join the 120-pin connector on the LapisColor card with the compatible 120-pin connector on the Direct Slot Adapter. Push firmly to ensure a proper connection.

## 8. Connect video cable to display card

Attach the 10-pin cable from the output connector to the 10-pin connector on the LapisColor card, marked Video Out. The two small notches on the 10-pin cable should face toward the two larger notches on the 10-pin connector on the LapisColor board itself. The cable is "keyed" to ensure a proper connection. Do not force the cable.

## 9. Connect the two cards to the IIsi expansion slot

Attach the Direct Slot Adapter 120-pin connector to the equivalent connector on the motherboard of the IIsi. Make sure the output connector on the LapisColor card fits through the Bus Access Port and the card itself rests on the two plastic edge supports previously installed. The components on the board should face down.



## 10. Replace the Macintosh lid

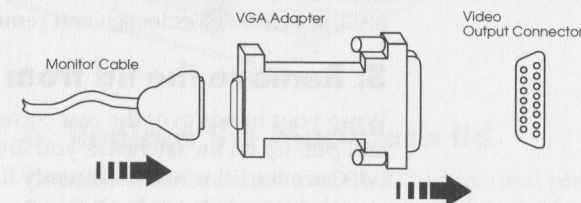
Place the cover back on top of the IIsi and press firmly on the back corners of the unit until the latches snap into place. If you desire, replace the security screw in the upper back panel of the Macintosh.

## 11. Re-connect all cords and peripherals

Plug in the power cord and re-connect all peripheral cords.

## 12. Connect your display cable to IIsi

Plug your display cable from your monitor into the output connector on the back of the IIsi. If your monitor cable has a VGA (15-pin, 3 rows) connector attach the provided DB-15 to VGA adapter to the output connector before attaching your display cable.



You have now completed the hardware installation of your LapisColor card. Please refer to the Configurations section on page 31. This section provides information on configuring the LapisColor software for your particular display.



## INSTALLING INTO AN LC/PERFORMA/QUADRA 605 MACINTOSH

These instructions are for installing the LapisColor card into a Macintosh with an LC-based PDS expansion slot. As of 3/95, this includes the following Macintosh systems: LC, LC II, LC III, LC 475, Performa 400 family, and Quadra 605. If your Macintosh is a more recent model and has an LC PDS expansion slot, the LapisColor should also be compatible. Please contact our Technical Support Department if you have additional questions.

### 1. Make sure your Macintosh is turned off and unplug all cords and peripherals

If your computer is still on, select "Shut Down" from the Special menu in the Finder. Switch off the computer, unplug the power cord and disconnect all peripheral cables from the back of the computer. Wait approximately five minutes to release any excess voltage charges.

### 2. If necessary, remove the security screw

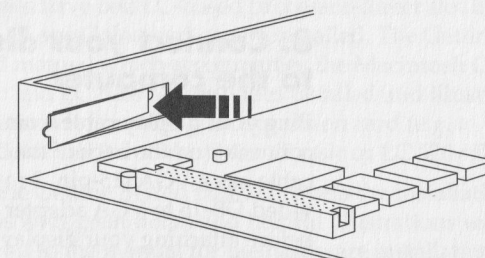
Your LC or Performa may have a small security screw located at the top center of the rear panel of the computer (it is used to hold the lid of the computer in place). Using a phillips screwdriver loosen and remove the screw.

### 3. Remove the lid from the computer

Wrap your hands over the rear corners of the computer and pull up on the latches as you lift up on the back of the lid. Once the lid is released, gently lift it up and toward you and store it in a safe place.

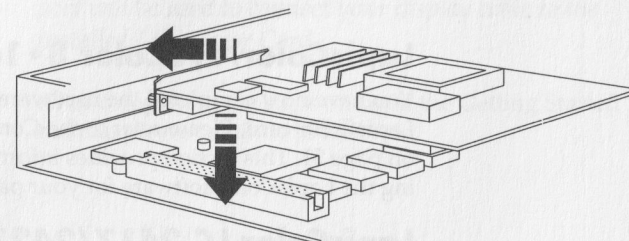
### 4. Open the LC Bus Access Port

The Macintosh LC Bus Access Port in the rear panel of the computer case has a plastic cover. From the inside, use your thumb to push the panel out.



### 5. Install the LapisColor card

Hold the LapisColor card by the back corners and insert the output connector of the LapisColor card into the LC expansion slot. Align the 96-pin connector on the bottom of the card directly over the expansion slot and push down firmly on the edge of the card until it is seated firmly.



### 6. Replace the Macintosh lid

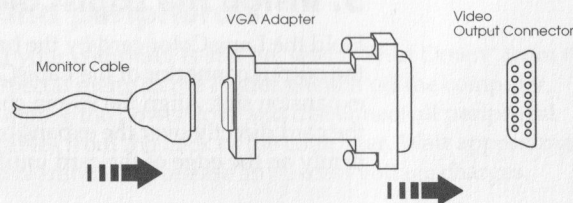
Place the cover back on top of the LC system and press firmly on the back corners of the unit until the latches snap into place. If you desire, replace the security screw in the upper back panel of the Macintosh.

## 7. Re-connect all cords and peripherals

Plug in the power cord and re-connect all peripheral cords.

## 8. Connect your display cable to the computer

Plug your display cable from your monitor into the output connector on the back of the computer. If your monitor cable has a VGA (15-pin, 3 rows) connector attach the provided DB-15 to VGA adapter to the output connector before attaching your display cable.



### LapisColor/ProColor 8•16 LC Users

You have now completed the hardware installation of your LapisColor card. Please refer to the Configurations section on page 31. This section provides information on configuring the LapisColor software for your particular display.

### LapisColor LC 2417/2421 Users

(proceed to page 33)

## INSTALLING INTO A MACINTOSH COLOR CLASSIC OR LC 520/575

These instructions are for installing the LapisColor card into the Macintosh Color Classic or LC 520/575. These machines have one LC-based processor-direct slot in which a LapisColor card can be installed. The Getting started manual which accompanies the Macintosh Color Classic and LC 520/575 provides detailed and illustrated instructions for installing an expansion card (e.g. a LapisColor card) into the Color Classic or LC 520/575.

Since the Getting Started manual covers the installation process with great detail and helpful illustrations we will refer you to the manual for the hardware installation of the LapisColor card. Please open your Color Classic or LC 520/575 Getting Started manual to the "Installing an expansion card" section and follow the instructions provided. During this process, please note the following item:

### NOTE:

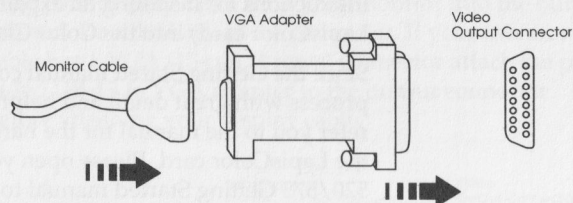
*It is necessary to remove the access cover on the Back panel of the Macintosh Color Classic or LC 520/575. This port will be used to connect your display cable to the installed LapisColor Card.*

After completing the steps outlined the Getting Started manual please continue as follows.



## 1. Connect your display cable to the computer.

Plug your display cable from your monitor into the output connector on the back of the computer. If your monitor cable has a VGA (15 Pin, 3 rows) connector attach the provided DB-15 to VGA adapter to the output connector before attaching your display cable.



You have now completed the hardware installation of your LapisColor card. Please refer to the Configuration section on Page 31. This section provides information on configuring the LapisColor card software for your particular display.

## INSTALLING INTO A NUBUS COMPATIBLE MACINTOSH

These instructions are for installing the LapisColor card into any Macintosh with a full-length NuBus expansion slot. As of 3/95, this includes the following Macintosh systems: II, IIx, IIfx, ILCi, ILCx, IIVx, IIVI, Centris 610 with NuBus adapter, Centris/Quadra 650, Quadra 660AV, 700, 750, 800, 840AV, 900, and 950. If your Macintosh is a more recent model and has a NuBus expansion slot, the LapisColor card should be compatible. Please contact our Technical Support Department if you have additional questions.

### Note:

*The illustration used in this section are based on a ILCi system. While the basic installation process is identical for most installations, you may want to consult the owner's guide for installation illustrations for your specific system.*

## 1. Make sure your Macintosh is turned off and unplug all cords and peripherals

If your computer is still on, select "Shut Down" from the Special menu in the Finder. Unplug the power cord and disconnect all peripheral cables from the back of the computer. Wait approximately five minutes to release any excess voltage charges.

## 2. If necessary, remove the security screw

Your system may have a small security screw located at the top center of the rear panel of the computer (it is used to hold the lid of the computer in place). Using a phillips screwdriver loosen and remove the screw.

## 3. Remove the lid from the computer

Wrap your hands over the rear corners of the computer and pull up on the latches as you lift up on the back of the lid. Once the lid is released, gently lift it up and toward you and store it in a safe place.

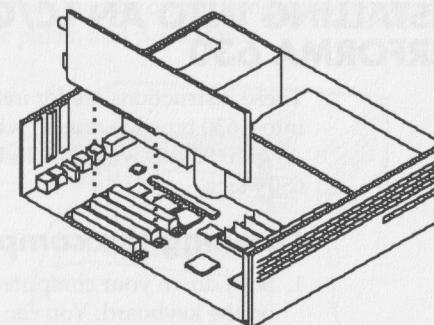
## 4. Choose an expansion slot

If your Macintosh has more than one NuBus slot you can install the LapisColor card into any available slot. Push out the cover plate on the back of the computer case that corresponds to the expansion slot you have chosen.

If your computer has a metal cover shield inside the case, lift it off so the hole in the back of the computer is accessible (not all Macintosh systems have this shield).

## 5. Install the LapisColor card

Hold the LapisColor card by the top corners and align the 96-pin connector on the bottom of the card directly over the expansion slot. Align the rear edge (the edge with the video connector) of the card with the hole in the back panel. Push down firmly on the edge of the card until it is seated firmly in the expansion slot.



## 6. Replace the Macintosh lid

Place the cover back on top of the Macintosh and press firmly on the back corners of the unit until the latches snap into place. If you desire, replace the security screw in the upper back panel of the Macintosh.

## 7. Re-connect all cords and peripherals

Plug in the power cord and re-connect all peripheral cords.

## 8. Connect your display cable to the Macintosh

Plug your display cable from your monitor into the output connector on the back of the computer. If your monitor cable has a VGA (15-pin, 3 rows) connector attach the provided DB-15 to VGA adapter to the output connector before attaching your display cable.

You have now completed the hardware installation of your LapisColor card. Please refer to the Configurations section on page 31. This section provides information on configuring the LapisColor software for your particular display.



## INSTALLING INTO AN LC/QUADRA/ PERFORMA 630

These instructions are for installing the LapisColor card into a 630 type Macintosh with an LC-PDS expansion slot. As of 3/95 this would include all LC/Quadra/Performa 630 Macs.

### Opening the computer

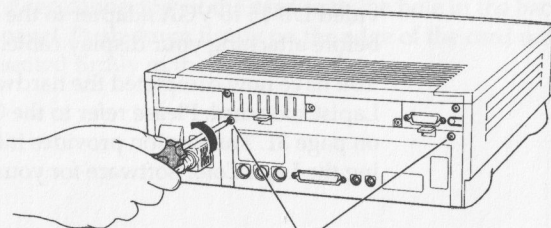
1. Shut down your computer by pressing the Power key on the keyboard. You can also choose Shut Down from the Apple () menu or Special menu.
2. Unplug all the cables except the power cord from your computer.

Leaving the power cord plugged into both the computer and the power outlet helps protect the computer from electrostatic discharge.

3. If there are security screws on the plastic panel on the back of the computer, remove the screws with a Phillips screwdriver.

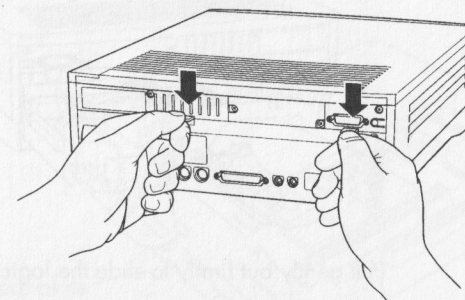
#### Note:

*To avoid generating static electricity that may damage components, do not walk around the room until you have completed the installation of the expansion card and closed the computer. Additionally, move the logic board as little as possible while it is outside the computer case.*

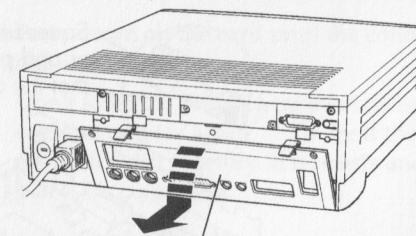


Remove both security screws from the back panel.

4. Place your thumbs on the two tabs at the top of the plastic panel, and press down.



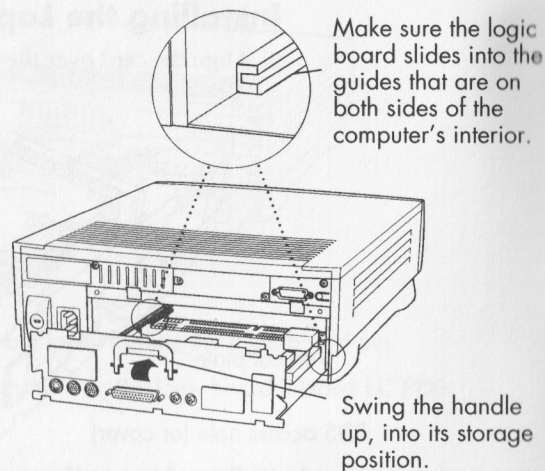
5. Pulling gently, swing the panel down and slip it out.



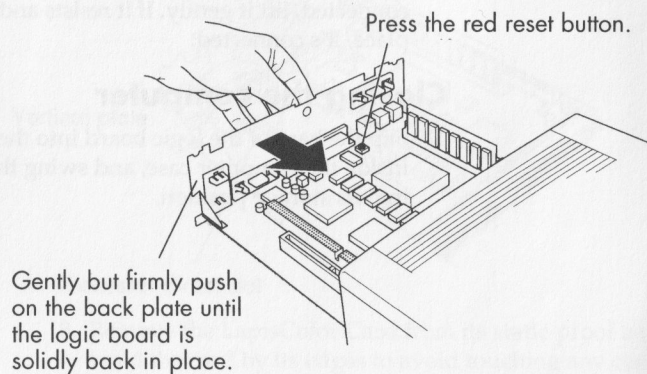
Remove the back panel.

6. Swing the handle out from its storage position. Then grasp the handle and gently but firmly pull it toward you.

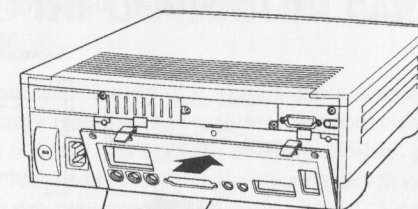
The vertical plate and the logic board to which it's attached slide all the way out of the computer.



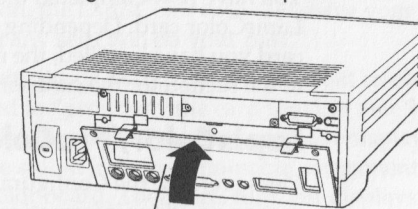
12. Press the red reset button on the logic board, and then slide the logic board back into the computer.



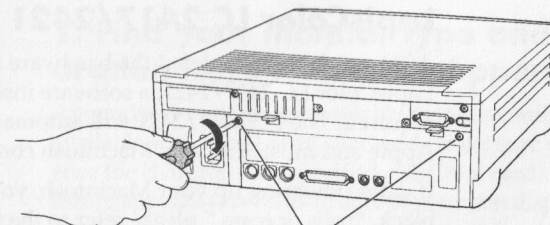
13. Slip the three hooks at the base of the plastic back panel into the grooves on the computer case.



Slip the three hooks on the back panel into the grooves in the computer case.



Snap the back panel into place.

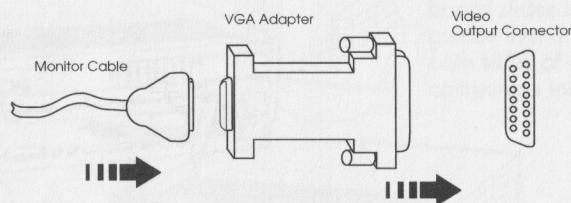


Insert security screws here.

14. Swing the plastic panel up and snap it into place.
15. If you removed security screws earlier, reinsert and tighten them now.
16. Reconnect the power cord and all peripherals.



17. Connect your display cable to the 630.



You have now completed the hardware installation of your LapisColor card. Depending on the model of LapisColor card you have installed, the next paragraph will direct you to the section for the card software configuration.

### LapisColor/ProColor 8•16 LC Users

Please refer to the Configuration section on page 31. This section provides information on the configuring the LapisColor Card software for your particular display.

### LapisColor LC 2417/2421 Users

After you have completed the hardware installation of the LapisColor LC 2417/2421, a software installation is not required. The LC 2417/2421 will automatically identify all Apple and most 3rd party Macintosh compatible displays.

If, after powering up your Macintosh, your monitor is black, "rolls or tears," please refer to the Configuration By Key chart on page 48/49. After determining which key combination matches your monitor brand/type, power on the Macintosh while holding down the combination of keys. Continue to hold down the keys (for a few seconds) until the Macintosh restarts itself again. Let go of the keys after the "Welcome To Macintosh" image becomes visible. For a detailed description on the functions of the LC 2417/2421, refer to page 33, Configuring the LapisColor LC 2417/2421 For Your Display.

## CONFIGURING THE LAPISCOLOR CARD FOR YOUR DISPLAY

The LapisColor family of graphics cards is compatible with a large number of computer monitors currently available. To achieve this breadth of compatibility, every LapisColor card is fully programmable. Each card is shipped pre-programmed to support a VGA compatible display at a resolution of 640 x 480 (with a vertical refresh rate of 60 Hz). If your monitor is compatible with this configuration, the LapisColor card will drive your monitor without any selection on your part.

If your display is designed for a different resolution you will need to "program" the card the first time you install the LapisColor card. The most common display configurations are stored in a programmable component on the LapisColor board. Therefore, for most displays, it is not necessary to install the software before configuring your display and LapisColor card.

### 1. Find your monitor type and configuration keys located in Appendix A

Appendix A outlines the available monitor configurations available with each LapisColor card (make sure you reference the chart for your specific LapisColor card). Under each listing appears several examples of common displays which are compatible with the corresponding configuration. Locate the configuration for which your display is compatible, and note the two configuration keys listed in the last column.

#### Important:

*If the configuration you selected for your display has a • symbol beside it, please skip to Step 2. If there is no • symbol, the configuration for your display is not built-in to the LapisColor card itself. In order to properly configure the card, you must start up the computer from the provided LapisColor software diskette.*

### **1a. Insert the LapisColor software diskette and start your Macintosh**

Make sure the Caps Lock key on your keyboard is off. After inserting the unlocked LapisColor software diskette into the computer's disk drive, turn on the computer and display. After turning on your system, hold down the configuration keys already determined in Step 1. For example, Radius TPD users would hold down "x" and "u" at the same time.

After a short period (30-45 seconds), the computer will chime once and automatically restart. At this point, you may let go of the two keys. Re-insert the diskette so the computer starts up from the floppy diskette. Please skip to Step 3.

### **2. Start your Macintosh and configure the LapisColor card**

Make sure the Caps Lock key on your keyboard is off. With the LapisColor card installed, turn on your Macintosh and computer display. Immediately after turning on your system, hold down the configuration keys already determined in Step 1. For example, Apple 16" display users would hold down "x" and "p" at the same time.

After a short period (30-45 seconds), the computer will chime once and automatically restart. At this point, you may let go of the two keys.

**Note:**

*Some monitors might display "unrecognizable noise" until the Macintosh restarts and the LapisColor card configures your display.*

### **3. Adjust the computer display**

Your LapisColor card is now programmed for your display. Unless you change displays or remove the LapisColor card from the Macintosh, it is not necessary to re-configure the LapisColor card.

If necessary, adjust the various controls on your computer display to achieve the best picture quality. Consult your display manual for detailed instructions.

## **CONFIGURING THE LAPISCOLOR LC 2417/2421 FOR YOUR DISPLAY**

The LapisColor LC 2417/2421 card is compatible with a large number of computer monitors currently available. To achieve this breadth of compatibility, the LapisColor LC 2417/2421 card is fully programmable. Each card is shipped pre-programmed to automatically identify all Apple and most 3rd party Macintosh compatible displays. If the card cannot detect a monitor type, it will default to a VGA compatible resolution of 640 x 480 (with a vertical refresh rate of 60 Hz). If your monitor is compatible with this configuration, the LapisColor card will drive your monitor without any further selection on your part.

If your display is designed for a different resolution (or the card could not identify your display) you will need to "program" the card the first time you install the card. All available display configurations are stored in a programmable component on the LapisColor LC 2417/2421 board. Therefore, a simple task of holding down a combination of keys on startup is all that is required to "program" (configure) the LC 2417/2421.

### **1. Find your monitor type and configuration keys located in Appendix A**

This section outlines all available monitor configurations available with the LapisColor LC 2417/2421 card. Under each listing appears several examples of common display resolutions which are compatible with the corresponding configuration. Locate the configuration for which your display is compatible, and note the two configuration keys listed in the last column on the right.



## 2. Start your Macintosh and configure the LapisColor card

Make sure the Caps Lock key on your keyboard is off. With the LC 2417/2421 card installed, turn on your computer display and your Macintosh. Immediately after turning on your system, hold down the configuration keys already determined in Step 1. For example, Apple 16" display users would hold down "x" and "p" at the same time.

After a short period (30-45 seconds), the computer will chime once and automatically restart. At this point, you may let go of the two keys.

**Note:** Some monitors might display "unrecognizable noise" until the Macintosh restarts and the LapisColor card configures your display.

## 3. Adjust the computer display

Your LC 2417/2421 card is now programmed for your display. Unless you change displays or remove the LapisColor card from the Macintosh, it is not necessary to re-configure the LapisColor card.

If necessary, adjust the various controls on your computer display to achieve the best picture quality. Consult your display manual for detailed instructions.

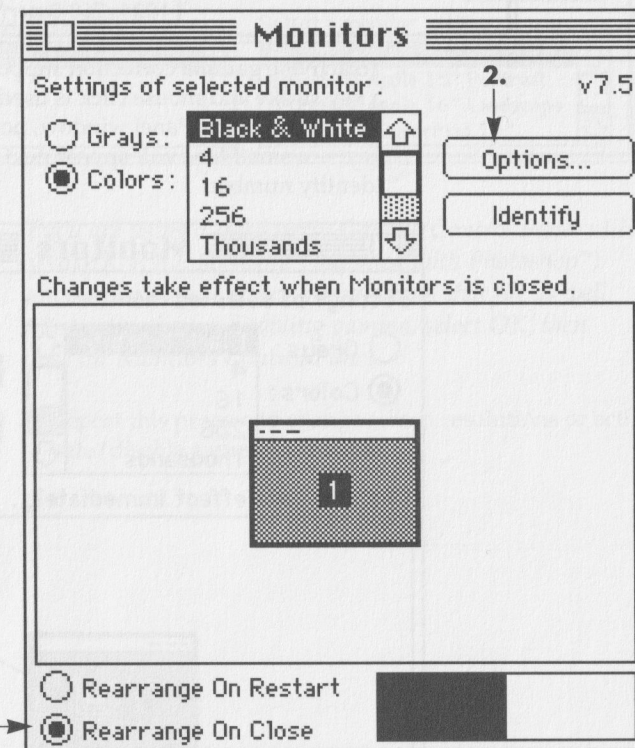
## 4. Resolution Switching

If your monitor brand/type has Multiple Resolution support, and system 7.1 or 7.5 is installed on your Macintosh, a resolution change (or "switch on the fly") function is supported by the LC 2421. This feature is very useful for decreasing (or increasing) the monitor resolution to suit a particular application. For example, certain games are dependent on a 14-inch (640 X 480) screen resolution and would occupy only 60% of the screen, leaving a large "border" on a 20-inch monitor. By toggling between 640 X 480 and 1024 X 768 (the default 20-inch resolution) you can set up your screen as needed. The procedures for resolution switching is detailed below.

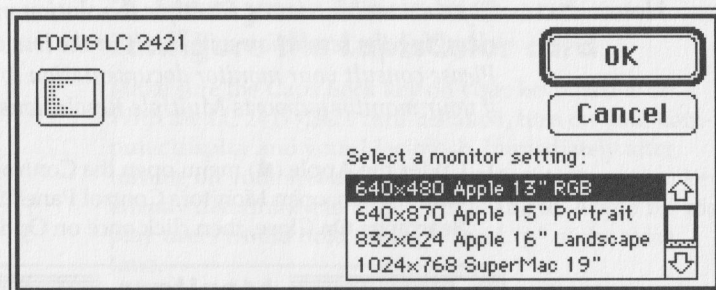
### Note:

*If your monitor is not a Multiple Resolution monitor, changing the resolution will result in the loss of video! Please consult your monitor documentation to determine if your monitor supports Multiple Resolutions.*

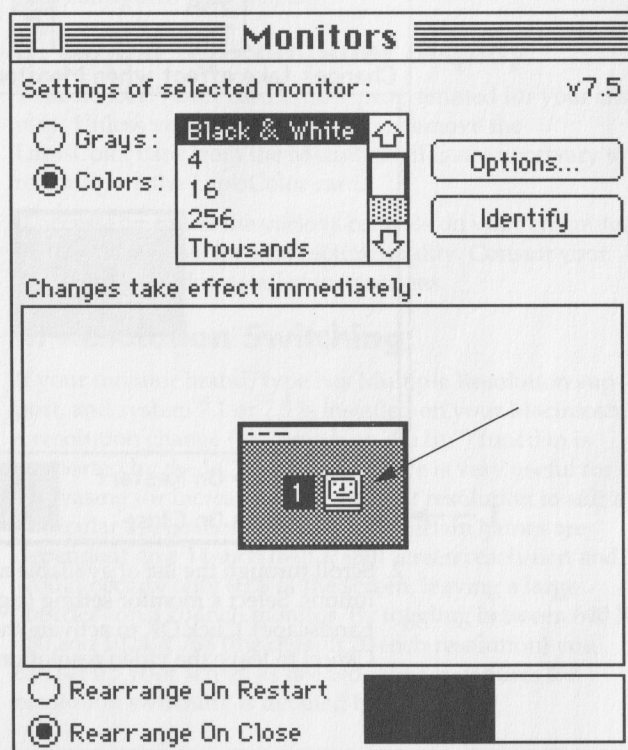
1. Under the Apple () menu open the Control Panels folder. Then, open Monitors Control Panel. Select Rearrange On Close, then click once on Options.



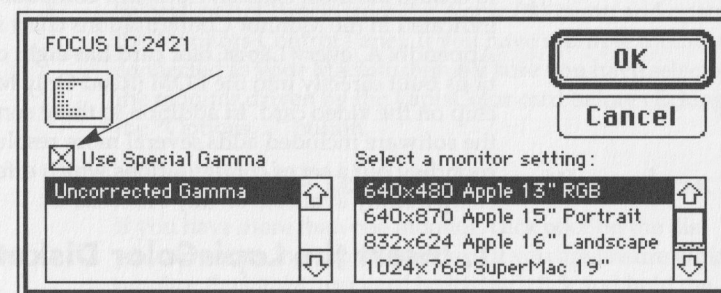
2. Scroll through the list of available monitor types/resolutions. Select a monitor setting (e.g. 832x624 Apple 16" Landscape). Click OK to activate the new resolution or Cancel to leave the video resolution unchanged.



3. To activate gamma correction support, a combination of a key stroke and mouse click is used. After opening the Monitors Control Panel window, hold down the Option key — a small Mac will appear next to the Monitor Identify number:



Once again, select Options. A second menu box will appear titled "Use Special Gamma". All gamma correction curves installed on the Macintosh will be available for selection. (Our example shows none).



**Note:**

*If you are using a third party Gamma Control Panel utility (like KNOLL Software®, supplied with Photoshop™) you can activate or adjust gamma from that file as well. After activating or disabling gamma, select OK, then close the Monitors Control Panel.*

4. Repeat this process to change screen resolutions or activate/disable gamma correction.



## INSTALLING THE SOFTWARE

Each LapisColor card (except the LapisColor LC 2417/2421) includes software offering advanced features to ensure the most extensive monitor compatibility. As indicated in the Monitor Configurations chart in Appendix A, every LapisColor card has eight configurations built directly into the ROM (Read Only Memory) chip on the video card. In addition to these configurations, the software included adds several more resolutions, rounding out a set of configurations which offer the most compatibility available on any video card.

### 1. Insert the LapisColor Diskette

Make sure the disk is unlocked (the tab on the top right side of the diskette should be closed) and insert into the computer's floppy disk drive.

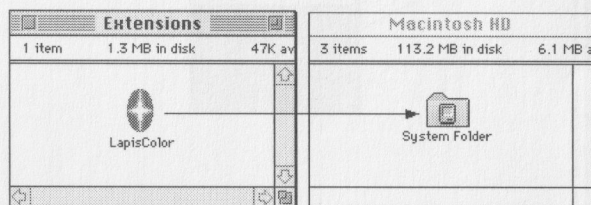
### 2. Copy the LapisColor control panel onto your hard disk

If you are using System 7, drag the LapisColor control panel into the System Folder. The System will automatically place the file in the Control Panels Folder.

If you are using System 6, drag the LapisColor control panel into the System Folder.

#### Note:

*Do not copy any other files from the diskette onto your hard disk. The LapisColor control panel is the only file necessary.*



The LapisColor software is accessed through the Monitors Control Panel.

### 3. Open the Monitors Control Panel

Select Control Panels from the Apple () menu and open the Monitors Control Panel. If you have multiple monitors connected to your Macintosh make sure you have selected the monitor driven by the LapisColor card before clicking the "Options..." button.

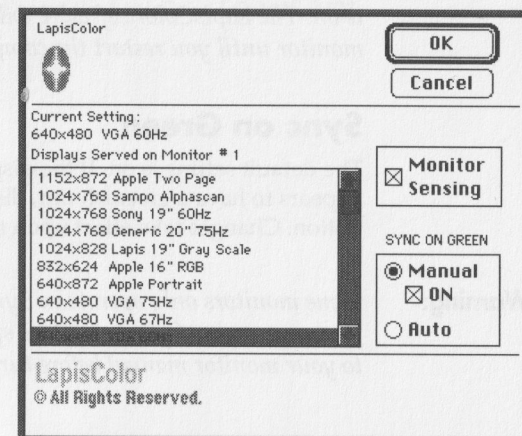
### 4. Open the LapisColor settings box

If you have more than one monitor, click once on the display driven by the LapisColor card. If you are unsure which monitor the LapisColor card is driving, click and hold the Identify button (for more information on the Monitors control panel, refer to your Macintosh User Guide).

Click once on the "Options..." button to call up the LapisColor settings box.

### 5. Select the Configuration

In the LapisColor dialog box, click once on the monitor configuration designed for use with your monitor. If necessary, refer to Appendix A on page 43 to locate the configuration with which your display is compatible.



## 6. Restart the System

Select Restart from the Special menu in the Finder. The LapisColor icon will appear on the bottom of the screen as it loads. In addition, the FOCUS logo will appear on the display being driven by the LapisColor card.

## THE LAPISCOLOR CONTROL PANEL

### Current Setting

Lists the current setting of the LapisColor board. This setting will not change until a new selection is made and you re-start the system.

### Monitor Sensing

During startup, this mode detects whether a monitor is connected to the LapisColor card. If no monitor cable is attached to the LapisColor card, the monitor is disabled. The default setting for monitor sensing is off to ensure monitor compatibility. After you have finished setting up your system, we recommend leaving monitor sensing on at all times.

**Note:** *If you start up the computer without the monitor cable attached and monitor sensing is on, you cannot attach the monitor cable to the LapisColor card while the computer is on. The LapisColor software will not recognize the monitor until you restart the computer.*

### Sync on Green

The default setting is on. If the display you are using appears to have a greenish tint, disable the sync on green button. Changes take effect upon restart.

**Warning:** *Some monitors only operate in Sync on Green mode. If you are unsure of your monitors specifications, please refer to your monitor manual before turning off Sync on Green.*

## TEMPORARILY DISABLING THE LAPISCOLOR CARD

Since there may be occasions when you need to use your Macintosh without its usual external monitor, you can temporarily disable the LapisColor card.

Simply disconnect the monitor cable from the back of the computer. The computer will start up as if there were no video card installed. Once you are ready to use the display again, simply re-connect the display cable to the computer and restart the machine.

**Note:** *Monitor sensing must be checked "on" in the LapisColor software settings accessible through the Monitors Control Panel\**

**Note:** *Once you have restarted after re-connecting the monitor, the screen orientation and menu bar position will be reset to default.*

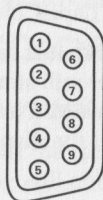
## PINOUTS

Illustrated on the following page are the pinout assignments for the DB-15 connector.

*\*Except the LapisColor LC 2417/2421*



### DB-9 (TTL, ECL1, ECL2)



TTL	ECL1	ECL2
1 Ground	1 ECL+	1 Ground
2 Ground	2 Ground	2 ECL 1+
3 Red	3 Horiz Sync	3 ECL 1-
4 Green	4 Vert Sync	4 ECL 2+
5 Blue	5 Video	5 ECL 2-
6 Intensity	6 ECL-	6 Ground
7 Intensity	7 Ground	7 Ground
8 Horiz Sync	8 Ground	8 Horiz Sync
9 Vert Sync	9 Ground	9 Vert Sync

**SIGNAL LEVELS**  
 ECL: 10K ECL Level  
 VSync TTL Levels  
 HSync TTL Levels  
 Video: Analog 0.7V P/P

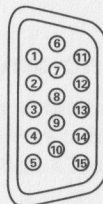
### DB-15 (Apple)



1 Ground
2 Red Video
3 Comp Sync
4 Ground
5 Green Video
6 Ground
7 Not Used
8 Not Used
9 Blue Video
10 Ground
11 Not Used
12 Vert Sync
13 Ground
14 Not Used
15 Horiz. Sync

**SIGNAL LEVELS**  
 Video: Analog 0.7V P/P  
 VSync TTL Levels  
 HSync TTL Levels

### DB-15 (VGA)



1 Red Video
2 Green Video
3 Blue Video
4 Not Used
5 Ground
6 Ground
7 Ground
8 Ground
9 Ground
10 Ground
11 Not Used
12 Not Used
13 Horiz Sync
14 Vert. Sync
15 (Reserved)

**SIGNAL LEVELS**  
 Video: Analog 0.7V P/P  
 VSync TTL Levels  
 HSync TTL Levels

## Appendix A: LapisColor Configurations

The LapisColor graphics card is compatible with a large number of computer monitors currently available. To achieve this breadth of compatibility, every LapisColor card is fully programmable. Each card is shipped pre-programmed to support a VGA compatible display at a resolution of 640 x 480 (with a vertical refresh rate of 60 Hz). If your monitor is compatible with this configuration, the LapisColor card will drive your monitor without any selection on your part.

The chart on the following page outlines the available monitor configurations for the LapisColor card.

### Note:

*The lists that follow are current as of 3/95. Please contact Technical Support if your display is not listed on the following page.*

**ProColorServer 8**

Includes ProColorServer 8 for LC, NuBus, and PDS/30

Computer Display	Resolution	Bit Depths & Max. Colors	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) <i>any VGA compatible display</i>	640 x 480	1,2,4,8 bit 256	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series <i>or compatible display</i>	640 x 480	1,2,4,8 bit 256	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Lapis Full Page GS Display ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ <i>or compatible display</i>	640 x 872	1,2,4 bit 16	68.85 KHz	75 Hz	x and 9	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 SuperMatch 17 Sony 1600 series <i>or compatible display</i>	832 x 624	1,2,4,8 bit 256	49.73 KHz	75 Hz	x and p	●
<b>Available through software only</b>						
VGA <i>any VGA compatible display</i>	640 x 480	1,2,4,8 bit 256	35.4 KHz	67 Hz	software only	
VGA <i>any VGA compatible display</i>	640 x 480	1,2,4,8 bit 256	39.4 KHz	75 Hz	software only	

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray

**LapisColor 8•16**

Includes LapisColor 8•16 LC, LapisColor 8•16 PDS/30, LapisColor 8•16 II, and ProColorServer 8•16

Computer Display	Resolution	Bit Depths & Max. Color	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) <i>any VGA compatible display</i>	640 x 480	1,2,4,8,16 bit 32,768	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series <i>or compatible display</i>	640 x 480	1,2,4,8,16 bit 32,768	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Lapis Full Page GS Display ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ <i>or compatible display</i>	640 x 872	1,2,4,8, bit 256	68.85 KHz	75 Hz	x and 9	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 SuperMatch 17 Sony 1600 series <i>or compatible display</i>	832 x 624	1,2,4,8,16 bit 32,768	49.73 KHz	75 Hz	x and p	●
FOCUS Two Page Display ■ <i>or Lapis Two Page Display</i>	1024 x 828	1,2,4,8 bit 256	64.5 KHz	75 Hz	x and l (as in "life")	●
Apple MultipleScan 20 NEC 3FG, 4FG, 5FG, 6FG SuperMatch 20 SuperMac Platinum™ 20" ■ RasterOps/20 RasterOps/20T	1024 x 768	1,2,4,8 bit 256	60.24 KHz	75 Hz	x and i	●
Apple 21" Display NEC 5FG, 6FG RasterOps 21" ■ RasterOps ClearVue 21" ■ Radius Precision Color 21" ■ SuperMac Platinum™ 21" ■ Sigma ■ <i>or compatible display</i>	1152 x 872	1,2,4,8 bit 256	68.68 KHz	75 Hz	x and q	●
<b>Available through software only</b>						
VGA <i>any VGA compatible display</i>	640 x 480	1,2,4,8, 16 bit 32,768	35.4 KHz	67 Hz	software only	
VGA <i>any VGA compatible display</i>	640 x 480	1,2,4,8, 16 bit 32,768	39.4 KHz	75 Hz	software only	
Sony 1900 series	1024 x 768	1,2,4,8 bit 256	48.8 KHz	60 Hz	x and 3	
Radius Precision Color 19" ■ Sampo Alphascan <i>or compatible display</i>	1024 x 768	1,2,4,8 bit 256	64.0 KHz	75 Hz	x and c	
Radius TPD 19" ■ Radius TPD 21" ■	1152 x 872	1,2,4,8 bit 256	65.0 KHz	70.5 Hz	x and u	
Toshiba	1152 x 872	1,2,4,8 bit 256	64.0 KHz	70 Hz	x and j	

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray



## LapisColor 24

Includes LapisColor 24 LC, LapisColor 24 SE/30, ProColorServer 24, and LapisColor 24 II

Computer Display	Resolution	Bit Depths & Max. Colors	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) any VGA compatible display	640 x 480	1,2,4,8,16,24 bit 16,777,216	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series or compatible display	640 x 480	1,2,4,8,16,24 bit 16,777,216	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Focus FPD or Lapis FPD ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ or compatible display	640 x 872	1,2,4,8, bit 256	68.85 KHz	75 Hz	x and 9	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 SuperMatch 17 Sony 1600 series or compatible display	832 x 624	1,2,4,8,16,24 bit 16,777,216	49.73 KHz	75 Hz	x and p	●
FOCUS Two Page Display or Lapis Two Page Display ■	1024 x 828	1,2,4,8 bit 256	64.5 KHz	75 Hz	x and l (as in "life")	●
Apple MultipleScan 20 NEC 5FG, 6FG SuperMatch 20 SuperMac Platinum™ 20" ■ RasterOps/20 RasterOps/20T or compatible display	1024 x 768	1,2,4,8, bit 256	60.24 KHz	75 Hz	x and i	●
Sony 1900 series or compatible display	1024 x 768	1,2,4,8, bit 256	48.8 KHz	60 Hz	x and 3	●
Apple 21" Display NEC 5FG, 6FG RasterOps 21" RasterOps ClearVue 21 ■ Radius Precision Color 21" SuperMac Platinum™ 21" ■ Sigma 21 ■ or compatible display	1152 x 872	1,2,4,8, bit 256	68.68 KHz	75 Hz	x and q	●

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray

## ProColorServer 24x

Includes ProColorServer LC, NuBus, and PDS/30

Computer Display	Resolution	Bit Depths & Max. Colors	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) any VGA compatible display	640 x 480	1,2,4,8,16,24 bit 16,777,216	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series or compatible display	640 x 480	1,2,4,8,16,24 bit 16,777,216	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Lapis Full Page GS Display ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ or compatible display	640 x 872	1,2,4,8, bit 256	68.85 KHz	75 Hz	x and 9	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 SuperMatch 17 Sony 1600 series or compatible display	832 x 624	1,2,4,8,16,24 bit 256	49.73 KHz	75 Hz	x and p	●
FOCUS Two Page Display ■ or Lapis Two Page Display	1024 x 828	1,2,4,8 bit 256	64.5 KHz	75 Hz	x and l (as in "life")	●
Apple MultipleScan 20 NEC 3FG, 4FG, 5FG, 6FG SuperMatch 20 SuperMac Platinum™ 20" ■ RasterOps/20 RasterOps/20T or compatible display	1024 x 768	1,2,4,8,16 bit 32,768	60.24 KHz	75 Hz	x and i	●
Sony 1900 series or compatible display	1024 x 768	1,2,4,8,16 bit 32,768	48.8 KHz	60 Hz	x and 3	●
Apple 21" Display NEC 4FG, 5FG, 6FG RasterOps 21" RasterOps ClearVue 21 ■ Radius Precision Color 21" SuperMac Platinum™ 21" ■ Sigma 21 ■ or compatible display	1152 x 872	1,2,4,8,16 bit 32,768	68.68 KHz	75 Hz	x and q	●

### Available through software only

VGA any VGA compatible display	640 x 480	1,2,4,8,16,24 bit 35.4 KHz	67 Hz	software only	
VGA any VGA compatible display	640 x 480	1,2,4,8, 16,24 bit 39.4 KHz	75 Hz	software only	
Radius Precision Color 19" Sampo Alphascan or compatible display	1024 x 768	1,2,4,8,16 bit	64.0 KHz	75 Hz	x and c
Toshiba 21" Color	1152 x 872	1,2,4,8,16 bit	64.0 KHz	70 Hz	x and j

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray

# LapisColor LC 2421

Includes LapisColor LC 2421

Computer Display	Resolution	Bit Depths & Max. Colors	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) any VGA compatible display	640 x 480	24 bit at all resolutions	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series or compatible display	640 x 480	24 bit at all resolutions	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Lapis Full Page GS Display ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ or compatible display	640 x 872	24 bit at all resolutions	68.85 KHz	75 Hz	x and 9	●
SVGA	800 x 600	24 bit at all resolutions	37.85 KHz	60.31 Hz	x and 2	●
SVGA	800 x 600	24 bit at all resolutions	48.08 KHz	72.18 Hz	x and 5	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 Sony 1600 series or compatible display	832 x 624	24 bit at all resolutions	49.73 KHz	75 Hz	x and p	●
FOCUS Two Page Display ■	1024 x 828	8 bit	64.5 KHz	75 Hz	x and l (as in "life")	●
Apple MultipleScan 20 NEC 3FG, 4FG, 5FG, 6FG SuperMac Platinum™ 20" ■ RasterOps/20 RasterOps/20T or compatible display	1024 x 768	24 bit at all resolutions	60.24 KHz	75 Hz	x and i	●
Sony 1900 series or compatible display	1024 x 768	24 bit at all resolutions	48.8 KHz	60 Hz	x and 3	●
Apple 21" Display NEC 4FG, 5FG, 6FG RasterOps 21" ■ RasterOps ClearVue 21 ■ Radius Precision Color 21" SuperMac Platinum™ 21" ■ Sigma 21 ■ or compatible display	1152 x 872	24 bit at all resolutions	68.68 KHz	75 Hz	x and q or x and w	●

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray

# LapisColor LC 2417

Computer Display	Resolution	Bit Depths & Max. Colors	Horizontal Scan Rate	Vertical Refresh Rate	Configuration Keys (hold both keys simultaneously)	
VGA (Default Setting) any VGA compatible display	640 x 480	24 bit at all resolutions	31.5 KHz	60 Hz	x and 1	●
Apple 13" RGB Apple 12" Mono ■ Apple 14" Color Display NEC 3FG, 4FG, 5FG, 6FG Seiko 1440 series Sony 1300 series or compatible display	640 x 480	8 bit	35 KHz	66.7 Hz	x and 4	●
Apple 15" Portrait Display ■ Lapis Full Page GS Display ■ Radius Full Page Display ■ Radius Pivot (Portrait Only) RasterOps ClearVue/15 ■ or compatible display	640 x 872	24 bit at all resolutions	68.85 KHz	75 Hz	x and 9	●
SVGA	800 x 600	24 bit at all resolutions	37.85 KHz	60.31 Hz	x and 2	●
SVGA	800 x 600	24 bit at all resolutions	48.08 KHz	72.18 Hz	x and 5	●
Apple 16" RGB Apple MultipleScan 17 E-Machines T-16 II Mitsubishi Diamond Pro 17" NEC 3FG, 4FG, 5FG, 6FG RasterOps Sweet 16 SuperMatch 17 Sony 1600 series or compatible display	832 x 624	24 bit at all resolutions	49.73 KHz	75 Hz	x and p	●
FOCUS Two Page Display ■ or Lapis Two Page Display	1024 x 828	8 bit	64.5 KHz	75 Hz	x and l (as in "life")	●
Apple MultipleScan 20 NEC 3FG, 4FG, 5FG, 6FG SuperMatch 20 SuperMac Platinum™ 20" ■ RasterOps/20 RasterOps/20T or compatible display	1024 x 768	16 bit at all resolutions	60.24 KHz	75 Hz	x and i	●
Sony 1900 series or compatible display	1024 x 768	16 bit at all resolutions	48.8 KHz	60 Hz	x and 3	●
Apple 21" Display NEC 4FG, 5FG, 6FG RasterOps 21" ■ RasterOps ClearVue 21 ■ Radius Precision Color 21" SuperMac Platinum™ 21" ■ Sigma 21 ■ or compatible display	1152 x 872	16 bit at all resolutions	68.68 KHz	75 Hz	x and q or x and w	●

● : software not required to configure display ■ : Grayscale only - maximum of 256 shades of gray



## TECHNICAL SUPPORT

If, after reading this User Guide, you are experiencing problems or you still have additional questions please contact our Technical Support Department for assistance. In order for us to have you up and running as quickly as possible, please be prepared to give a detailed description of your problem when you call. If possible, call from in front of your computer, as the Technical Support Representative may ask you to perform additional tests to determine the cause of the problem.

FOCUS Enhancements Technical Support 617-937-5500

### Technical Support Hours:

9 A.M. to 8 P.M. Eastern Standard Time (EST) Mon-Fri

10 A.M. to 5 P.M. Eastern Standard Time (EST) Sat

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## WARRANTY

FOCUS Enhancements, Inc. warrants this product against defects in materials and workmanship for a period of THREE (3) YEARS from the date of original purchase.

If you discover a defect, FOCUS Enhancements, Inc. will, at its sole option, repair or exchange the product at no charge to you, provided you contact FOCUS Enhancements, Inc. Technical Support to obtain a Return Material Authorization (RMA) Number and instructions on where and how to obtain repair. Note that a copy of the bill of sale bearing the FOCUS Enhancements, Inc. serial numbers as proof of date of original purchase is required for each product returned for warranty service. Before returning product, remove all non-FOCUS Enhancements, Inc. RAM, accessories, and options. FOCUS Enhancements, Inc. cannot be liable for the return or care of any non-FOCUS Enhancements, Inc. products, nor accept responsibility for loss or damage of product in transit.

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Product specifications and information are subject to change without notice.



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