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1- INTRODUCTION

1-1Overview

The operator workspace monitor must be properly adjusted for the filmed image to accurately represent the console monitor displayed image. This procedure will describe how to adjust the LCD display monitor to match the camera. Once the LCD display monitor is re-calibrated, it is essential to re-calibrate the camera before the system is used for filming.

1-2 Camera Vendor Participation

It is recommended that this procedure is performed with the Camera Vendor field engineer, present, should any camera adjustment be necessary. To optimize customer satisfaction, it is also recommended that you have one of the Customer's filming specialists available for the fine tuning and quality review of the film/LCD display monitor conformance.

2- VERIFY AMBIENT LIGHTING CONDITIONS

In the review area and operator workspace area, verify that the ambient lighting conditions are adjusted to a minimum level. In the operator workspace area, there should be only sufficient light for safely operating the system.

In the review area and operator workspace area, verify that light-boxes are not emitting light, or are properly masked, when not displaying film. This will be a source of excessive glare

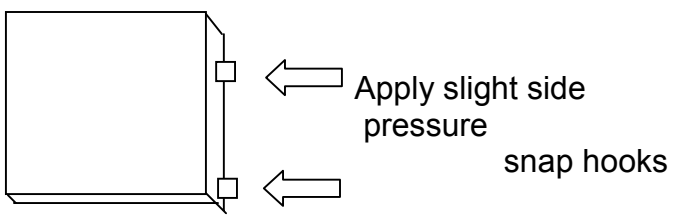
In both review area and operator workspace area, verify that there is no source of glare for reviewing films or setting up the images for film. For example, windows should not allow direct light. (blinds should be closed).

Note that both, the operator workspace area and the review area artificial lighting type should be of the same type.

3- NEC 1850X MONITOR INSTALLATION

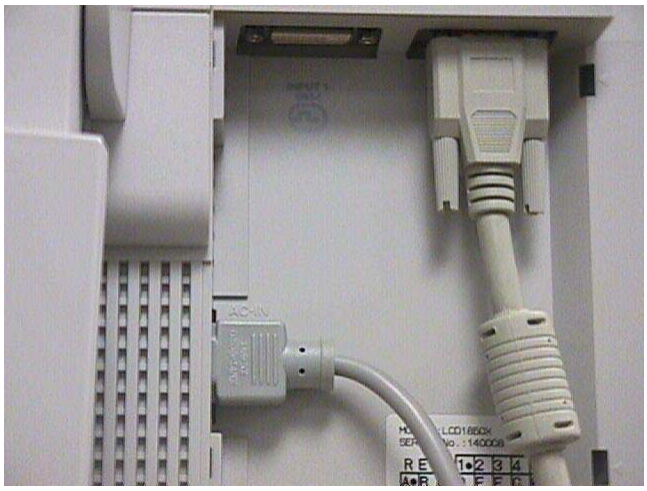
1. Shutdown Signa and perform a safety lockout/tagout of the Operator Workspace. See Safety procedure to accomplish this.

2. Remove the new LCD monitor from its box and its packing and set the NEC 1850X LCD color monitor on the workspace desktop and remove its rear cover. Apply light pressure to side of cover to release the plastic snap hooks. See Illustration 3-1



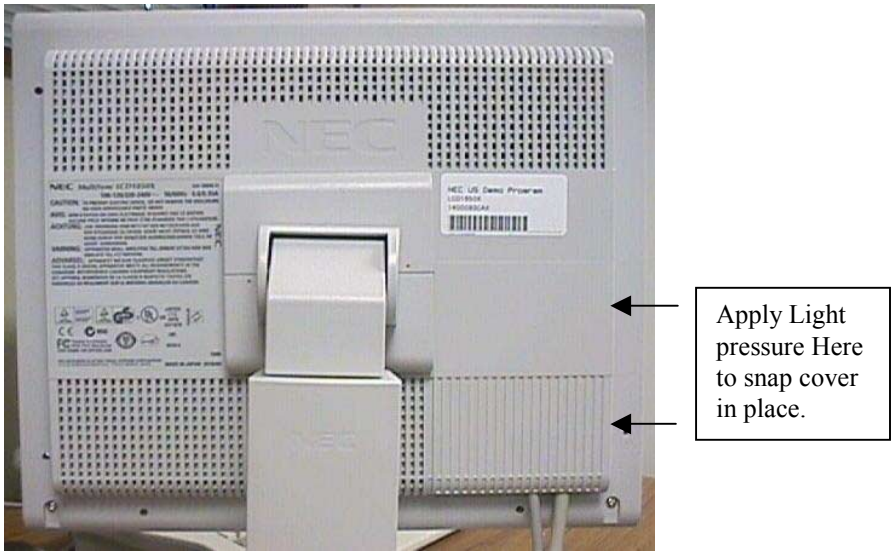
REMOVING BASE COVER
ILLUSTRATION 3-1

1. Connect the Video and power cables. Route these cables neatly to the back of the Operators Workspace. See Illustration 3-2.



VIDEO AND POWER CABLE CONNECTIONS
ILLUSTRATION 3-2

2. Re-attach the cover to the back of the LCD. Apply light pressure on the right side of the small cover to lock the cover in place. See Illustration 3-3



REPLACING THE REAR COVER
ILLUSTRATION 3-3

3. Remove the Safety Lockout of the Operators Workspace and restore power to the system.

4. Verify that main LCD monitor power is ON. If not, press the power button on the front panel and the side panel to turn the main LCD monitor ON. See Illustration 3-4 for side view.

5. The monitor should be positioned no closer than 16 inches and no further away then 28 inches from your eyes. The optimal distance is 24 inches for either of the monitors.

Note

Allow the monitor to warm-up for 20 minutes before performing any adjustments.

POWER SWITCH LOCATION (ALWAYS LEAVE ON)
ILLUSTRATION 3-4

1. Boot up Signa

2. Password: **adw2.0** <enter>

4- SIGNA HOST GAMMA SETUP- NEC 1850X

The GAMMA value is modified to optimize the contrast level of the image mid-tones to more closely represent the same contrast that is filmed. This process uses a "Look-up" table for closer HIPPA and DICOM compliance versus a single gamma setting on earlier models of LCD's and CRT's.

4-1 Installing the Gamma Look-Up-Table for the NEC 1850X LCD Color Monitor

1. Insert GEMS Service Documentation CD ROM 2160623 Rev 14. Or Service CD 2250758 Rev 2 in the Signa host CDROM drive. The service class of the service CDROM does not matter.
2. On the Host SGI Computer, Open **C-Shell**.
3. Type: **cd /usr/g/bin** <enter> (IRIX is case sensitive. Always use case exactly as shown)
4. Type: **su root** <enter> At password, type: **operator** <enter>
5. Type: **mediad <Enter>** (Mount CDROM Drive to File System, takes 20-30 seconds)

Note
If a message appears stating “another mediad is already running”, ignore it.

6. Type: **/CDROM/gamma/setfiles** <enter>

Note
Message appears stating the action was performed.

7. Type: **umount /CDROM** <Enter> (Release the CDROM Drive.)

8. Type: **exit** <Enter> (Changes user privileges. "root level" access to "sdc level" access).

9. Type: **rungamma** <Enter>

10. The menu shown in Table 4-1 will display.

TABLE 4-1
GAMMA TOOL SELECTIONS

```
Make a selection between 1 and 7 to proceed!

[1] For INSTALLING NEC 2010X Calibration

[2] For UNINSTALLING NEC 2010X Calibration

[3] For INSTALLING NEC 1850X Calibration

[4] For UNINSTALLING NEC 1850X Calibration

[5] For INSTALLING EIZO L660 Calibration

[6] For UNINSTALLING EIZO L660 Calibration

[7] For QUITTING this Program
```

11. Determine the LCD monitor type your system is using. The name and model number is usually found on the front face of the monitor.

12. At the prompt type the number corresponding to your monitor type and if you wish to install or uninstall the gamma tables.

The tool takes only seconds to run. A successful installation or removal message will appear and the system will go back to the command line prompt. Any errors reported will also suggest what to do next.

13. type: **exit** <enter> Close the C-Shell.

14. Remove the Service CDROM from the drive at this time.

Note

If you push the button on the front of the CDROM Reader and it does not open, it is because you did not properly "un-mount" the CDROM from the File System.

1. Re-open a C-shell
2. login as root, Password: operator
3. Type: **umount /CDROM**. (Make sure to type "umount" not "u**n**mount")
4. Exit the C-Shell.
5. Eject the CDROM with the button.

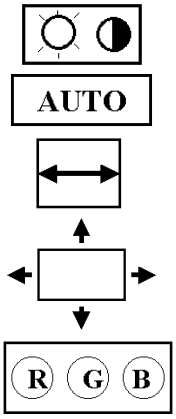
15. **Re-boot Signa** to save and activate the change to software.

5- LCD AUTO ADJUSTMENT AND OSM™ ON SCREEN MANAGER OPERATIONS

This section should get you familiar with the basic operation of the monitor controls. The intent of this section is to adjust the monitor to a "default" condition to proceed with calibrations. It also will allow you to become familiar with the button panels and the OnScreenManger setup.

After the installation of the LCD monitor, the following adjustments must be performed:

1. Adjust Brightness/Contrast →
2. Auto Adjust →
   a. Image Adjust (automatic) →
   b. Position Control (Automatic) →
3. AccuColor™ set-up (9300k) →



4. Readjust contrast and brightness to customer's recommendation.

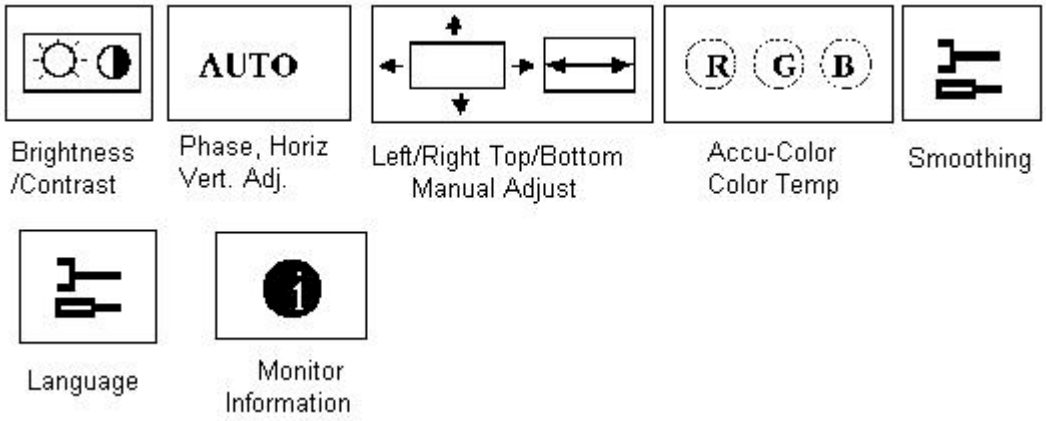
Note

Manual Adjustment of the Position Control and Image Adjust H. Size/Fine controls is rarely needed. Automatic adjustment takes care of this.

Adjustment bar extended to 80%

NEC 1850X LCD FRONT PANEL OSM ACCESS BUTTON AND MENU
ILLUSTRATION 5-1

1. To access the On Screen Manager OSM™, press the OSM button on the front panel

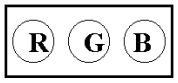


MONITOR ADJUSTMENT ICONS
ILLUSTRATION 5-2

Note

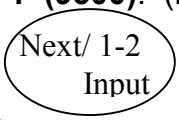
To Rotate the OSM Menu Between Landscape and Portrait mode press the OSM button On, then Exit Button, then press OSM button again.

2. Use the **Control** buttons ◀ ▶ on the front of the monitor to select the Brightness and Contrast icon and set the brightness and contrast bars to about 80% of full value to start.
3. Select the Next/ 1-2 Input Button on the front of the monitor.
4. AUTO Push either the left and right **Control** buttons ⊖ ⊕ to initate the Auto Adjust of the Phase/ Vertical and Horizontal Centering.
5. Select Next/ 1-2 Input On front of monitor.

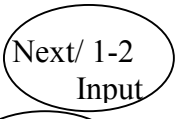
6. From the **AccuColor® Control System** icon 

and use the ◄ ► **Control** buttons to select the first entry row under this icon.

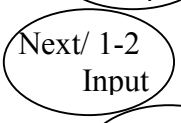
7. Select: **1 (9300)**. (Monitor Color Temperature)

8. Press 

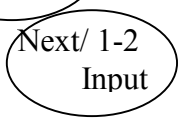
on front of monitor.

9. Leave **Smoothing** setting at **Default**, press 

on front of monitor.

10. Leave **Language** setting at **Default**. press 

on front of monitor.

11. Leave **Display mode** setting at **Default**. press 

on front of monitor.

12. Press the Exit Button. All adjustments are now saved. These settings will remain in effect even if power is removed, or system software is re-booted. Unless manually changed by the operator in the OSM , On Screen Manager.

13. The monitor adjustment is complete. The LCD Display Monitor is now ready for integration to Signa.

Note

For further information, of the OnScreenManager and button identification, refer to the NEC LCD 1850X User's Manual that came with the LCD Display.

6- SETTING LCD MONITOR FREQUENCY RATE

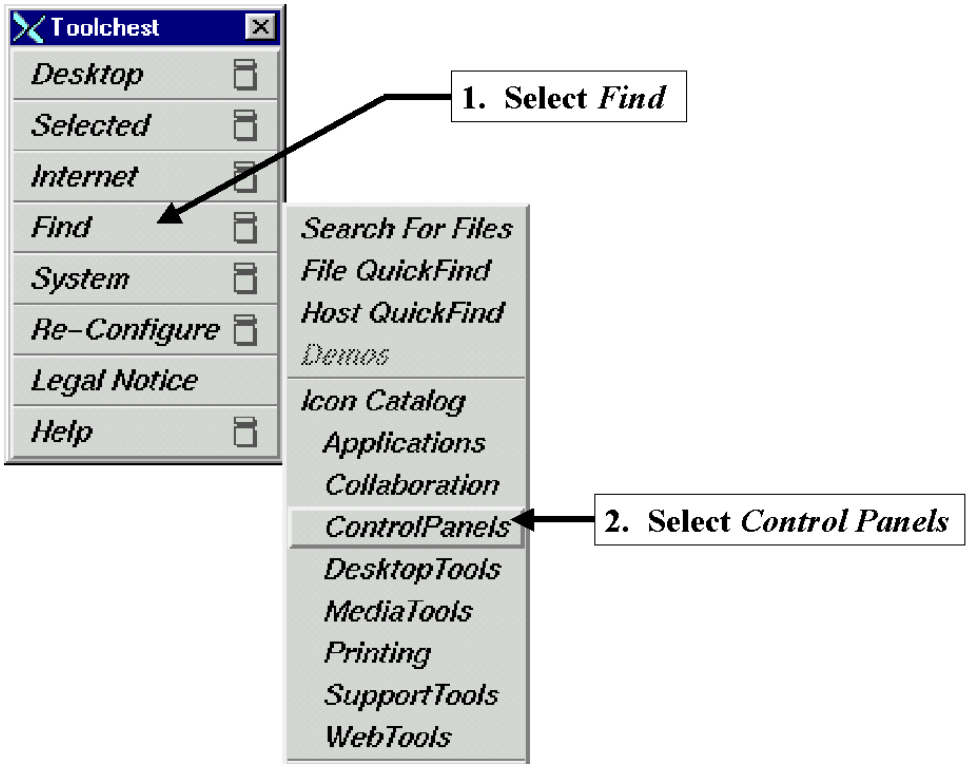
6-1- Configuring the Frequency Rate

1. Boot signa down and restart the system.

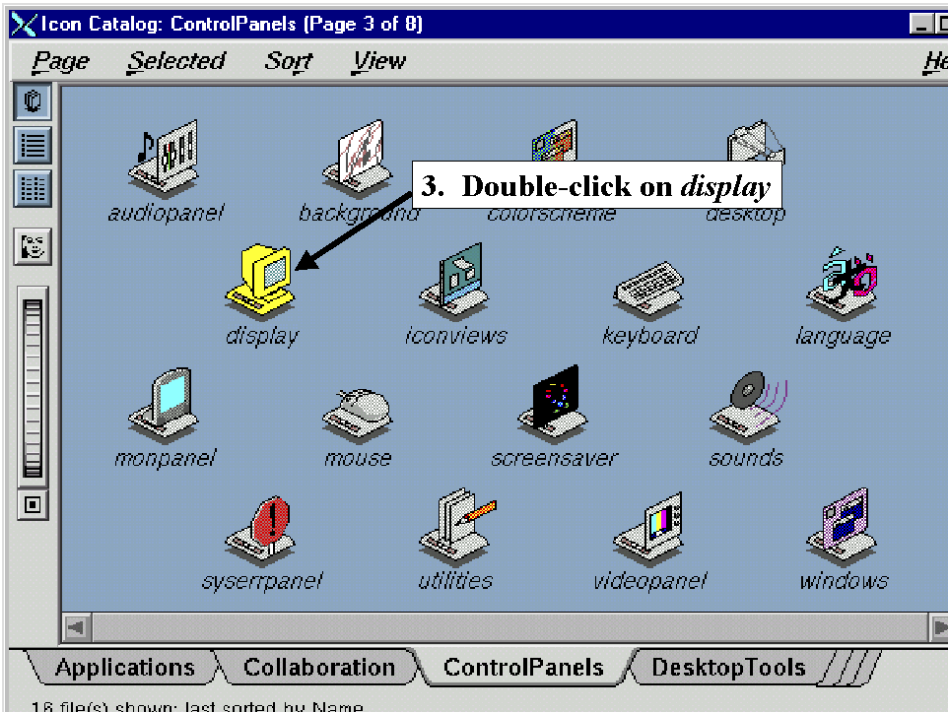
2. At the login window type **root** (Do not select the Signa boot icon or type Signa)

3. Type the password **operator [Enter].**

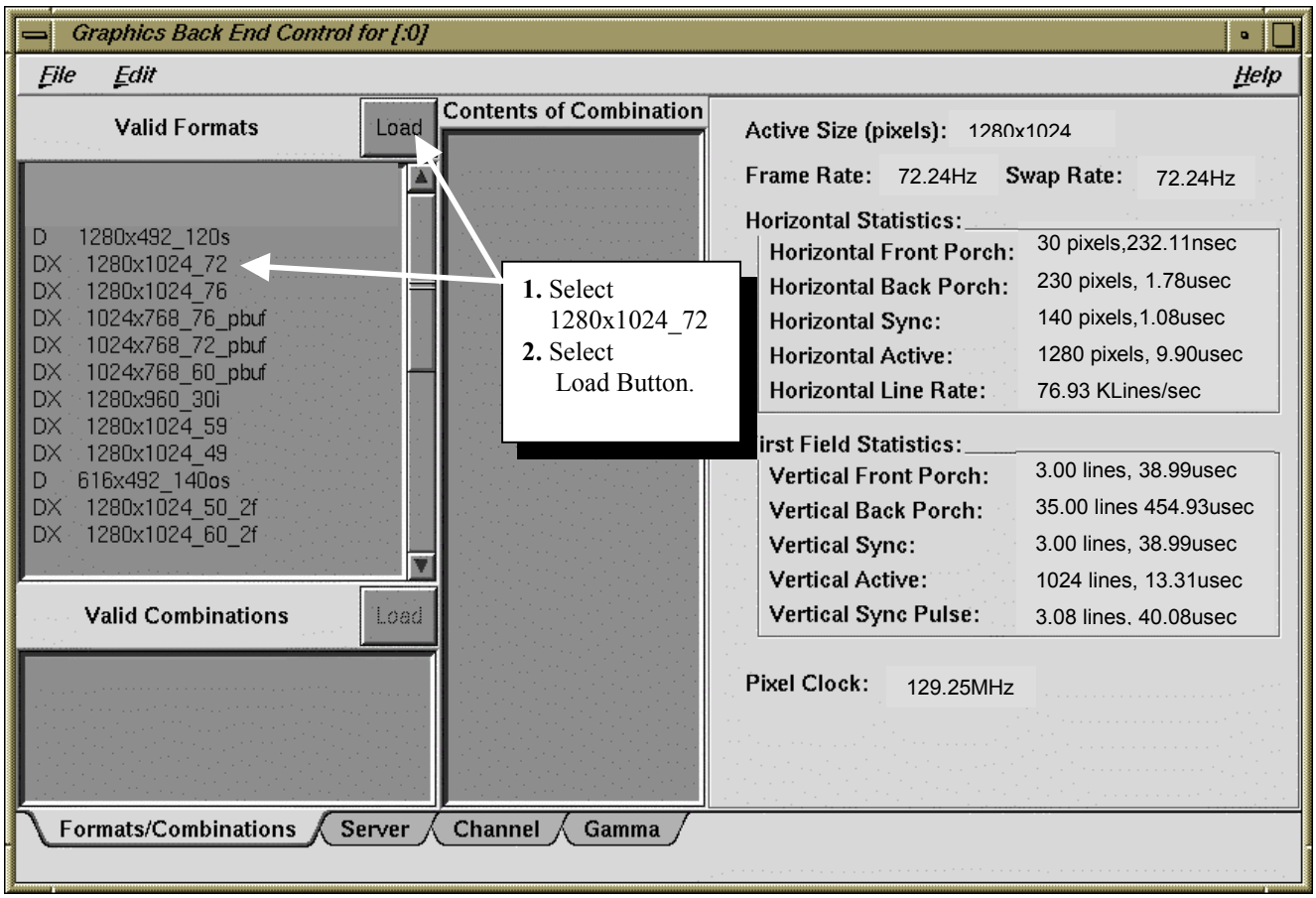
4. A menu like that shown in Illustration 6-1 should appear in the upper left corner of the display within 20 seconds. Make the selections as shown in Illustration 6-1 and 6-2.



TOOLCHEST MENUS
ILLUSTRATION 6-1



DISPLAY SETTING THROUGH CONTROL PANELS
ILLUSTRATION 6-2



LINE RATE WINDOW
ILLUSTRATION 6-3

5. From the Display screen select **1280 X 1024_72**.

6. Verify that **1280 X 1024_72** is highlighted. At the top left of the selection window select **Load**.

7. Answer **OK** to the display message prompting you to load the new format.

8. A second display message will appear asking if you want to make the new format the power-on default. Select **OK**.

9. The screen will immediately change to the new setting.

10. From the upper left corner of the Graphics Back End Control window select "**File**" and **"Exit"**.

11. Position the cursor over the Toolchest label bar at the top of the Toolchest menu, single-click with the **Right mouse** button and then select **close** from the list of selections to close the Toolchest menu.

12. **Right click** the mouse on the background of the display to open up a drop down menu.

13. Select **logout** from the menu. Answer **yes** to the display message that appears.

14. Boot Signa back up.

15. Login : **Signa** Password: **adw2.0** <enter>

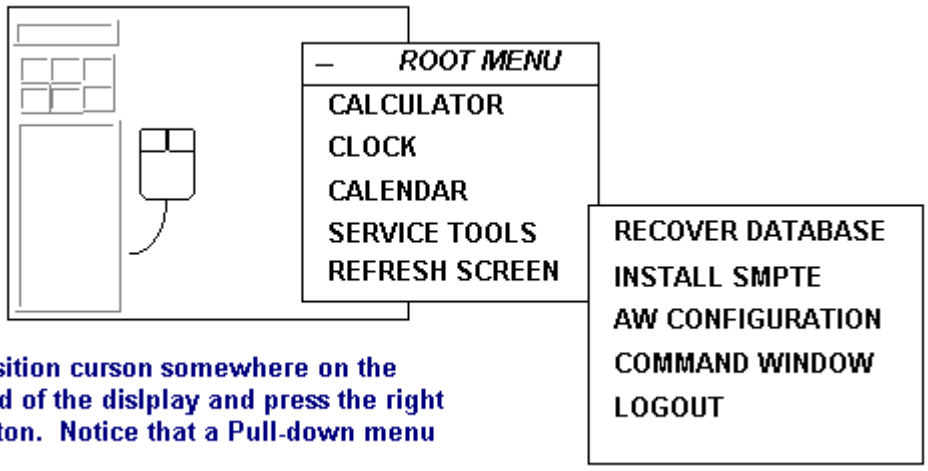
7- LCD CALIBRATION FOR OPTIMUM IMAGE VIEWING

The SMPTE (Society of Motion Picture and Television Engineers) test pattern is used to provide a standard image for calibrating the Window and Level of the display for an MR scanner.

7-1 Displaying the SMPTE Pattern

The Window and Level adjustments must now be set to ensure site to site uniformity in image appearance. The SMPTE test pattern is available on the Operator Workstation Host Computer after IRIX, (The operating system) has been booted, and after you have logged into the system.

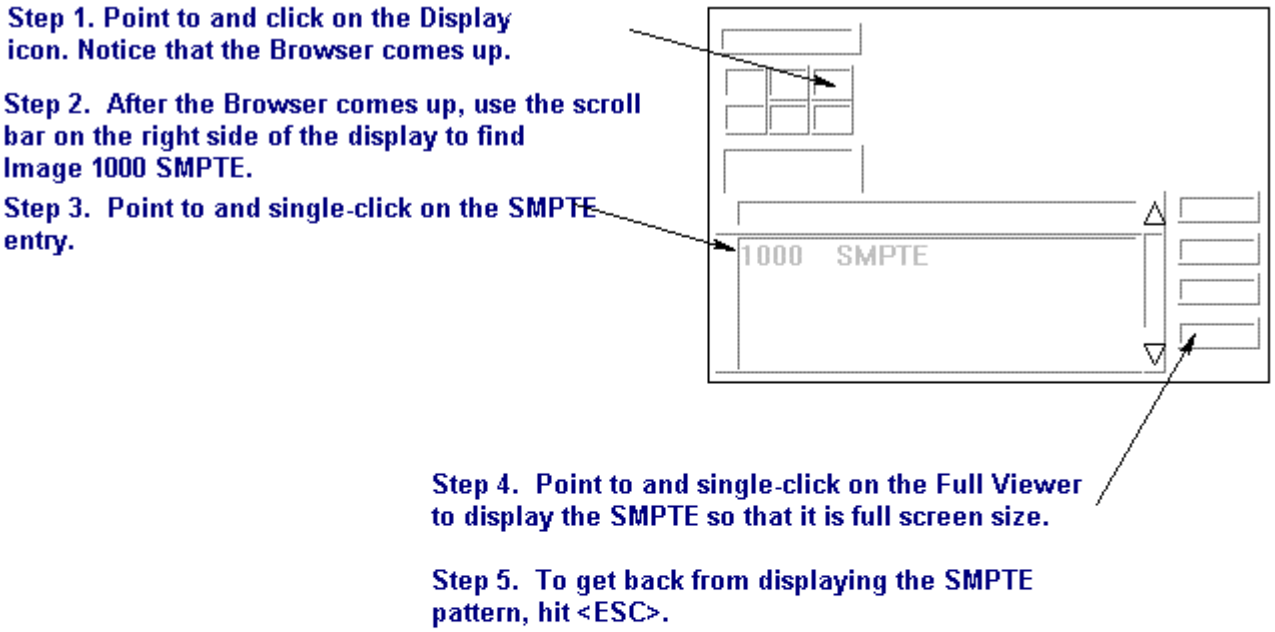
1. Install and display the SMPTE pattern. Using the steps in illustration 7-1 Below :



INSTALLING THE SMPTE PATTERN
ILLUSTRATION 7-1

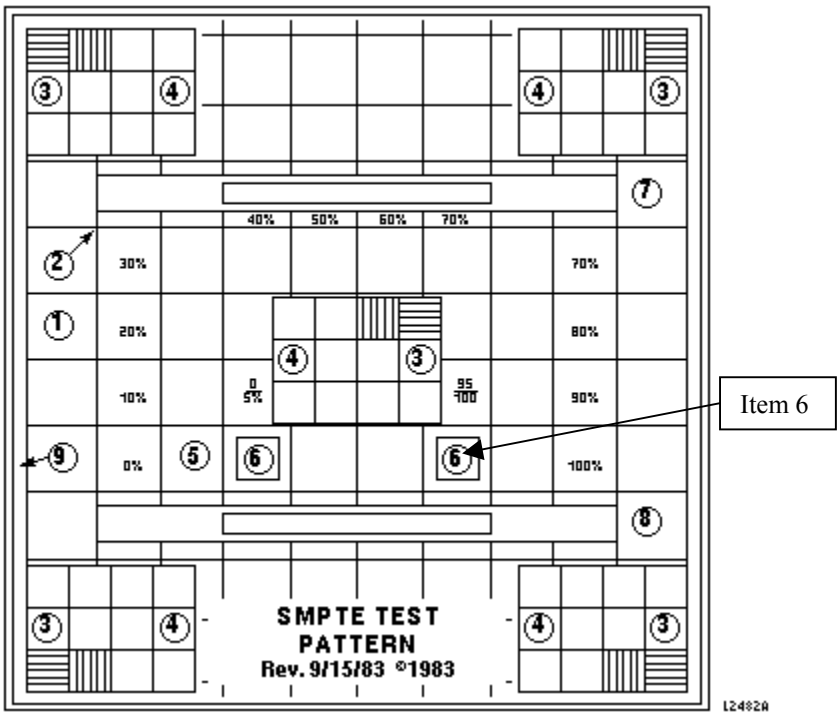
2. Displaying the SMPTE Pattern by following the steps in illustration 7-2 on the next page. Switch to the Browser and select the SMPTE pattern from the patient list and display it.

3. If necessary, use the FORMAT option to select Full Screen mode.



INSTALLING THE SMPTE PATTERN
ILLUSTRATION 7-2

7-2 Adjusting for proper Window and Level Setting



SAMPLE SMPTE TEST PATTERN
ILLUSTRATION 7-3

1. With the cursor inside the displayed image, hold down the middle mouse button and move the mouse in the horizontal plane. View the window control value at the base of the image and **set window control value to 100**.

2. With the cursor inside the displayed image, hold down the middle mouse button and move the mouse in the vertical plane. View the level control value at the base of the image and **set level control value to 1024**.

7-3 Fine Tuning the Contrast and Brightness using the SMPTE Pattern

In this section you will adjust the Contrast and brightness controls of the LCD Monitor to optimize the SMPTE Test Pattern for the Window and Level controls.

Minimal adjustment should be necessary at this time. However, it is important that you "fine tune" the Contrast and Brightness level using an industry Standard Test pattern.

This is an iterative process by adjusting the contrast, then brightness, and then back to contrast.

Note

To reduce visible tearing or smearing of the pattern, LOWER the contrast.

3. Push the OSM button to display the On Screen Manager.

Adjustment bar extended to 80%

NEC 1850X LCD FRONT PANEL OSM ACCESS BUTTON AND MENU
ILLUSTRATION 7-4

Note

To Rotate the OSM Menu Between Landscape and Portrait mode press the OSM button On, then Exit Button, then press OSM button again.

14. Use the **Control** buttons ◀ ▶ on the front of the monitor. To elect and adjust the Brightness and Contrast , use the ⊖ ⊕ buttons.

4. Look at the Pattern. If the 5% and 95% patches are not visible.(item 6, Illustration 7-3), adjust the brightness control of the display monitor until you can just barely see them. You may also need to re-adjust the contrast, if tearing or smearing of the pattern occurs. (items 1 and 2, and 5 through 8, Illustration 7-3).Continue adjusting both brightness and contrast until the image is as crisp and clear as you can make it, and the 5% and 95% patches are just barely visible.

5. When satisfied with the display, exit the menu to save the adjusted Contrast/Brightness settings.

Note

These settings will remain in effect even if power is removed or the system is re-booted. Because an operator can tamper with the Brightness and Contrast Adjustments, It is highly recommended that you make all operators aware of the affect they will have on system image quality.

Note

If the operator chooses to deviate from this Brightness and Contrast adjustment, ensure the camera imaging and calibration has NOT been affected.

6. Remove the SMPTE Pattern by selecting a different Exam from the browser.

8 - CAMERA CALIBRATION

This procedure describes the steps necessary to verify and set the camera parameters. Once the display is re-calibrated, it is essential to re-calibrate the camera before the system is used for filming. Although a qualified GE Service Engineer could perform the steps below, it is recommended that the following procedure be performed with the on-site assistance of the camera vendor field engineer.

8-1 DASM Interpolation Setup

1. Select the **Install** soft key from the Service Desktop. When prompted, login using the password **operator**.

2. Select the **DASM** folder from the top of the Guided Install GUI once it appears.

3. Set the DASM Interpolation method to **linear**.

4. Before exiting the GUI, insert the SaveInfo MOD or new MOD into the drive. Go to the top left corner of the Install GUI and select **<File>** and then **<Save GI Configuration to MOD>**. This process does not create a SaveInfo disk. It just creates a copy of the information already entered in the GUI tabs for use in the next software install.

5. Exit the install GUI by selecting **<File>** then **<Quit>**. If any error conditions still exist, you will be warned that no changes will be made before exiting.

8-2 Camera Imaging Look-up Table

Verify with the camera vendor field engineer that the currently installed camera lookup table is designed to provide perceivably linear contrast for the light box conditions in the customer's viewing area. If not, request that the camera vendor field engineer replace it with the appropriate look-up table.

8-3 Camera Maximum Optical Density

Note that for optimal reviewing, the light box luminance of the diagnostic region of the film should be in the range of 50 to 500 nits. Vary the maximum optical density setting of the camera to compensate for the light box and to meet this value. A good starting position is a maximum density of 2.8.

Note

The final OD settings may be refined by the radiologists performing the image review.

8-4 Camera Contrast

1. With the maximum /minimum optical densities set to compensate for the review area's light box, select a look-up table for your camera that will produce a perceivably linear gray scale for the same light box and the overall ambient light conditions of the viewing area.

Note

The DICOM 3.14 Standard specifies the Barten's curve for linear perception. It is recommended that the manufacturer base perceptual linearity on this curve.

2. Film the SMPTE pattern on a 1-on-16-format display. Verify that the 5% and the 95% levels are visually equivalent. If not, perform a Contrast test with the SMPTE pattern. Select the new contrast setting from the contrast image set. A good value for the Imation DryView is 3. Use the camera's calibration procedure to set the contrast setting. Ensure that the camera maintains a perceivably linear gray scale.

Note

Filming the SMPTE pattern for contrast calibration may be optional for the camera vendor.

3. Ask the technologist to display a clinical image and set window and level controls for the desired appearance. A good image to start with is a sagittal or axial head image.

4. Capture the image on the keypad or host control interface.

5. Print a Contrast Test film. Ask the technologist to select the image that best matches the displayed image on the monitor.

6. Observe the image number below the selected image and set the Contrast control to this value.

8-5 Anatomical Filming

This portion of the procedure requires the technologist to verify the camera settings with true anatomical images.

1. Film representative anatomical images to confirm the settings. The image set should include T1 and T2 head images, joint images and c-spines.

2. Observe the accuracy of the low-tones, mid-tones and high-tones. If a filmed image is found to not be equivalent then re-calibrate the camera based on the customer's evaluation.

9 - TROUBLESHOOTING GUIDE

The following section provides suggestions for troubleshooting the LCD monitor:

- **No Picture**
  - The signal cable should be completely connected to the display card/computer.
  - The display card should be completely seated in its slot.
  - Power Switch and computer power switch should be in the ON position.
  - Check the signal cable connector for bent or pushed-in pins.

- **Image Persistence**
  - Image persistance is when a “ghost” of an image remains on the screen even after the monitor has been turned off. Unlike CRT monitors, the LCD monitor’s image persistance is not permanent. To alleviate image persistance, turn off the monitor for as long as an image was displayed. If an image was on the monitor for one hour and a “ghost” of that image remains, the monitor should be turned off for one hour to erase the image.

  Note

  It is recommended that a screen saver be used whenever the screen is idle.

- **Image is unstable, unfocused, or swimming is apparent**
  - Signal cable should be completely attached to the computer.
  - Check the monitor and your display card with respect to signal timings.
  - Change the video mode to non-interlace and use a 50 Hz refresh rate.
  - Use the OSM™ Image Adjust controls to focus and adjust display by increasing or decreasing the fine control. When the display mode is changed, the OSM™ Image Adjust settings may need to be re-adjusted.
  - If your text is garbled, change the video mode to non-interlace and use a 50 Hz refresh rate.

- **LED on monitor is not lit (no green or amber color can be seen)**
  - Power Switch should be in the ON position and power cord should be connected.
  - Make certain the computer is not in a power saving mode.

- **Display image is not sized properly**
  - Push the Auto adjustment button.

- **Selected resolution is not displayed properly**
  - Push the Auto adjustment button.

- **Diagnostic Image Quality has been traced to problem with LCD setup.**

- Operator has adjusted the Brightness and Contrast of the monitor which has affected Camera/Film imaging. Re-calibration may be necessary. Start with Section 1 of this procedure.

- **Display image has a green cast to it**
  - Select "**TYPE**" in the OSM™ Information menu and press the ◂ or ▸ control button.

A- APPENDIX A

A-1 Focus, Screen position, Clock Rate and Phase Adjustments.

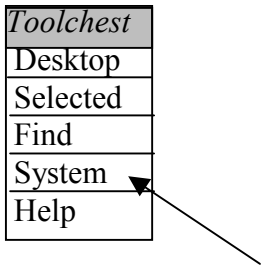
The Auto Adjust procedure done in Section 5 takes care of these for you. All other values in the Screen Manager should stay at the default values except Contrast and Display.

Use this appendix only if you see problems with Focus, screen position relative to monitor mask or phase problems (horizontal bars sweeping through the LCD). Or any vertical problems.

A-2 Adjusting Focus Using LX Calibration Tools From Toolchest (Alternate)

This section is normally not needed. However, if you cannot adjust the monitor satisfactorily, with the front panel buttons and OnScreenManager, you may want to try the adjustments described in this section.

1. From the Tools Menu on Signa Open a C-Shell.
2. Type: **[toolchest&].** A pulldown menu will appear in the upper left-hand portion on the display.



TOOLCHEST MENU
ILLUSTRATION A-1

3. Select **[System]** with the Right mouse button.
4. Select **[Confidence Tests]** from the extended menu. A “confidence test” pop-pup will appear after a few seconds.
5. From the “confidence test” pop-up, select the **[Monitor Icon]**. A monitor calibration menu will appear on the screen.
6. Select **[Focus]** from the "Test Options" menu by using the **Tab** key.
7. Put the mouse pointer on the "Test Options" Menu. Click the **Middle mouse button** to toggle (Hide) the "Test Options" menu.

8. Push the auto-adjustment button on the front of the monitor. This should setup Focus, Horizontal, Vertical Centering, sync to the proper Clock Rate and monitor Phase.
9. Observe the test pattern displayed, it should now be centered and in focus. This should be all that is necessary to adjust the display controllers' output to match the LCD monitor.
10. Toggle the “monitor calibration” toolbar back on by selecting the middle mouse. Select the grayscale menu option.
11. Toggle the menu back off by selecting the middle mouse again.

A-3 Setting up LCD Display for Contrast/Brightness. Using LX Calibration Tools From Toolchest (Alternate)

This alternative procedure uses the Monitor Calibration tools and patterns. Steps 1 through 4 should be done while observing the image for crisp lines, overall uniformity of pattern, and to setup the LCD monitor so it is at its brightest level without "Blooming the image or adding distortions". The intent of this part of the appendix is to achieve the best image appearance you can with the LCD. At the completion of this section you should check the display against industry standard SMPTE pattern. (See Section 7 of this procedure - LCD CALIBRATION FOR OPTIMUM IMAGE VIEWING)

1. Select “**Contrast/Brightness**” button and **push enter**.
2. Adjust brightness to maximum level **100%.**
3. Look at the monitor and adjust the Contrast and Brightness to optimize the test clarity of the test pattern. This is an iterative process between both settings.
4. When satisfied with the displays' contrast and brightness setting is properly achieved, **push the enter button to save the adjusted Contrast/Brightness settings**.
5. Exit the Monitor Calibration by selecting "**Quit**".
6. Select "**File**" on the Confidence Test Window and choose "**Exit**".
7. **Click on the word "Toolchest**" at the top of the menu with the **Right mouse button** and select "**Close**".
8. Exit the C-Shell by typing: **Exit [Enter]**

A-4 Monitor Adjustments

The monitor should be positioned no closer than 16 inches and no further away then 28 inches from your eyes. The optimal distance is 24 inches for either of the monitors.

Note

Allow the monitor to warm-up for 20 minutes before performing any adjustments.

Note

The response time for the LCD monitor is 100 ms. It is normal to see a “trail” on the screen if the mouse is moved quickly.

A-5 Contrast and Brightness Adjustment For NEC1850X LCD Monitor

You will need to use the SMPTE pattern for this adjustment. Refer to that section in this procedure.

1. From the Contrast and Brightness icon  use the **Control** buttons to adjust the contrast lower if the maximum setting causes visible tearing or smearing of the pattern or alphanumeric characters (items 1,2,5-8 in Illustration 7-3).

2. From the Contrast and Brightness icon  use the **Control** buttons to adjust the brightness of the display monitor if the 5% and 95% patches are not visible (item 6 in Illustration 7-3).

Note

It may be necessary to re-adjust the contrast if tearing or smearing of the pattern or alphanumeric characters occurs (items 1,2,5-8 in Illustration 7-3).

A-6 Control Descriptions- NEC 1850X LCD Monitor

The NEC 1850X LCD Panel Display does not have an RGB (BNC) style input. The video cabling uses an S-VGA type connection. It also has additional DVI/D-SUB input capability. This feature allows for the switching of inputs between two LCD Monitors, (Not Used by GE).

BUTTONS ON FRONT PANEL
ILLUSTRATION A-2

Note

Adjustment information is not lost when the power is removed from the monitor.

A-7 Front Panel Controls

The functions of the OSM™ controls on the front of the monitor are described in Table A-1. To access the OSM, press any of the control buttons (**+**,**-**, ◀ , ▶) or the RESET/OSM or EXIT buttons.

Note

When RESET is pressed, a warning window will appear allowing you to cancel the reset function.

TABLE A-1
FRONT PANEL CONTROL FUNCTIONS - MODEL 1850X LCD MONITOR

Control	Main Menu	Sub-Menu
EXIT	Exits the OSM™ controls.	Exits to the OSM™ controls main menu.
CONTROL + -	Used to access main menu. Moves the highlighted area up/down to select one of the controls.	Moves the highlighted area up/down to select one of the controls.
CONTROL ◀ / ▶	Has no function	Moves the bar in the + or - direction to increase or decrease the adjustment
Next/ Input 1-2:	Allows movement within the highlighted menu.	Moves Highlighted area within option.
RESET/OSM: The currently highlighted control to the factory setting	Resets all the controls within the highlighted menu.	Resets the highlighted control.

A-8 On-Screen Controls

This section describes the adjustments available for the OSM controls. The controls labeled with "•" are required during the set-up of the monitor.

- **Brightness and Contrast →** 

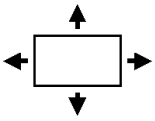
Brightness: Adjusts the overall image and background screen brightness.

Contrast: Adjusts the image brightness in relation to the background.

Auto Adjust Contrast: Adjusts the image displayed for non-standard video inputs.

- **Auto Adjust →** 

Automatically adjust the Image Position or the H. Size setting.



Position Controls →

H. Position: Controls Horizontal Image Position within the display area of the LCD.

V. Position: Controls Vertical Image Position within the display area of the LCD.

Auto: Automatically sets the horizontal and vertical image position within the display area of the LCD.

- **Image Adjust Controls →** 

H. Size: Adjusts the horizontal size by increasing or decreasing this setting.

Fine: Improves focus, clarity, and image stability by increasing or decreasing the Fine setting.

Auto Adjust Coarse: Automatically adjusts the Coarse setting.

- **AccuColor® Control System →** 

Five color presets select the desired color setting. This setting must be set to selection 1 - **9300**. If a setting is adjusted, the name of the setting will change to Custom.

R, B, G: Increases or decreases the color depending upon which is selected. The change in color will appear on screen and the increase or decrease will be shown by the color bars.

Tools 1 → 

You can choose where the OSM control image appears on the screen. Selecting OSM Location allows you to manually adjust the position**.** Normally**,** no adjustment is necessary. Use default values.

Smoothing - (Normal) Default
Expansion Mode- (Full Screen) Default
Video Detect- (First Detect) Default
DVI Selection- (Default) No effect on S-VGA systems.
Sound- Minimum (Default)

Tools 2 → 

You can choose where the OSM control image appears on the screen. Selecting OSM Location allows you to manually adjust the position**.** Normally**,** no adjustment is necessary. Use default values.
Language- English
OSM Position- Default location
OSM Turn OFF- Default

OSM Lock Out- This control completely locks out access to all OSM control functions. When attempting to activate controls while in Lock Out mode, a message screen will appear indicating that the controls are locked out. Lockout is NOT recommended.

Factory Preset- This allows you to reset all OSM control settings back to the factory settings. Highlighting the setting and then pressing the RESET button can reset individual settings.

Resolution Notifier- Optimal Resolution is 1280x1024. If ON is selected a message will appear on the screen 30 seconds, notifying the user that the resolution is NOT at 1280x1024.

Information → 

Indicates the current display resolution, frequency setting, and type of Sync signal of the monitor. All items under this menu should not be changed. Use default values.

Note

Mode Change should only be used if the monitor does not recognize a resolution. This shouldn't ever be the case with our system. You can change to the appropriate resolution by selecting the Mode information and selecting (increase or decrease) the corresponding option.

A-9 LCD Specifications

Specifications LCD Module: 18.1-inch (18.1" viewable image size), active matrix, thin film transistor (TFT), liquid crystal display (LCD),0.28 mm dot pitch, XtraView+ technology, RGB vertical stripe color filter arrangement, 240 cd/m2 white luminance typical, 300:1 contrast ratio - typical

MultiSync LCD1850X Features: Ultra-Thin Frame (bezel), Xtraveiw+ Technology, No touch auto-adjust, OmniColor, sRBG color setting, Ambix support for analog and digital connections, 3rd-Party Touch Screen and Protective Glass integration, Digital Smoothing, Digital Control, Color Control (4 mode + sRGB, OSM Plug and Play (VESA DDC 1/2B), VESA DPMS Power Management, User (OSM) controls, Optional MultiSync sound bar (attachable in either portrait and landscape mode)

Sync: Separate sync: TTL level (Positive/Negative)
Composite sync: TTL level (Positive/Negative)
Sync on Green: Video 0.3 Vp-p Negative (0.7Vp-p postive)

Display Colors: 16.7 Million

(Dependent upon display card used)

Viewing Angle: Left/Right: 85°
Up: 85°
Down: 85°

Synchronization Range (Automatically): Horizontal: 31.0 kHz to 82.0 kHz
Vertical: 55.0 Hz to 85.0 Hz

Resolutions Supported: 720 x 400* @ 70 Hz
640 x 480 @ 60 Hz to 85 Hz
800 x 600* @ 56 Hz to 85 Hz
832 x 624* @ 75 Hz
1024 x 768 @ 60 Hz to 85 Hz
1280 x 1024 @ 60 Hz to 76 Hz

NOTE: Some systems may not support all modes listed.

Active Display Area: Horizontal: 14.1 inches / 359 mm
Vertical: 11.3 inches / 287 mm

(Dependent upon signal timing used)

Input: Ambix (VGA 15pin & DVI-I)

Power Consumption: ON: 65 W
Power Savings Mode: 3 W

Voltage Rating: Universal 100 (110-240V) 50-60Hz Internal

Current Rating: 0.8A @ 100 - 120V / 0.4A @ 220 - 240V

Signal Cable: 15-pin mini D-SUB to 15-pin mini D-SUB (Supplied)

Dimensions: Net (with stand):
15.7 in (W) x 17.5 in (H) x 8.6 in (D)
398 mm (W) x 452 mm (H) x 218 mm (D)

Net (without stand):
15.7 in (W) x 13.7 in (H) x 2.9 in (D)
398 mm (W) x 349 mm (H) x 74.4 mm (D)

Gross:
21.1 in. (W) x 21.6 in. (H) x 12.3 in. (D)
535 mm (W) x 548 mm (H) x 312 mm (D)

Weight: Net (with stand): 18.7 lbs. / 8.5 kg

VESA Hole Configuration Spec. 100 x 100 mm

Operating Temperature: +41° F to +95° F / +5° C to +35° C

Operating Humidity Range: 30% to 80%

Operating Altitude: 0 to 10,000 Feet

Storage Temperature: +14° F to +140° F / -10° C to +60° C

Storage Humidity Range: 10% to 85%

Storage Altitude: 0 to 45,000 Feet

Accessories: User's Manual, (1) VGA 15-pin D-Sub cable, (1)DVI-D to DVI-I cable, (1) Power cord, (1) CD-ROM, with Liquid View (tm) software, and Portrait software.

General Limited Warranty: 3-Year Parts and Labor, 3-Year backlight

Power Management: IPM™ (Intelligent Power Manager) System, EPA Energy Star®, meets NUTEK based on 2 power saving modes

User Controls: Power, Brightness, Contrast, Vertical and Horizontal Position, Phase, Color Control

Regulatory Approvals: UL/C-UL or CSA; TUV/GS; ENERGY STAR; TCO '95; CE; FCC CLASS B/CANADIAN DOC; TUV/ERGONOMIE; MPRII; Ctick

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
A	Aug 8, 2001	D. Hofstetter	Initial Version.
0	Nov 14, 2001	D. Hofstetter	Added Gamma Table Setup Section 4.
1	Dec 14, 2001	D. Hofstetter	Changed Monitor Frequency rate to 72Hz for all monitor configurations.