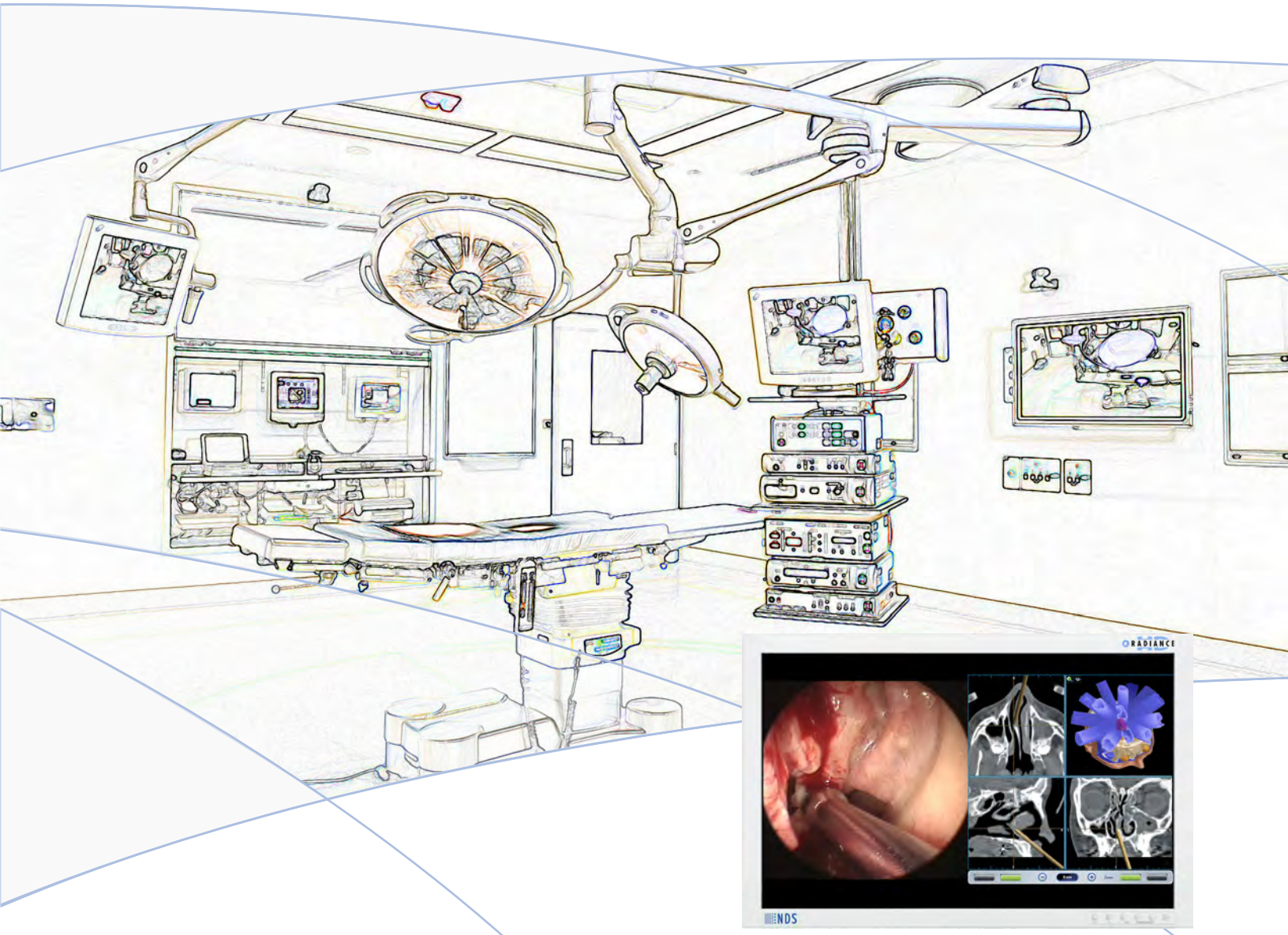
NDS
SURGICAL · IMAGING



RADIANCE 37, 42, 52 & 55 HD

High-Definition, Multi-Modality Imaging

RADIANCE HD

USER MANUAL

[ENGLISH]

Table of Contents

1 CAUTION

This symbol alerts the user that important literature concerning the operation of this unit has been included. Therefore, it should be read carefully in order to avoid potential problems.

This symbol warns user that un-insulated voltage within the unit may have sufficient magnitude to cause electrical shock. Therefore, it is dangerous to make contact with any part inside the unit. To reduce the risk of electric shock, **DO NOT** remove cover (or back). ***There are no user serviceable parts inside.*** Refer servicing to qualified service personnel.

To prevent fire or shock hazards, do not expose this unit to rain or moisture. Also, do not use this unit's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. The display is designed to meet the medical safety requirements for a patient vicinity device. This device **may not** be used in connection with life support equipment.

Underwriters Laboratories (UL) Classification:

UL Safety Compliance:
These LCD monitors are U.L. Recognized WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1/CAN/CSA C22.2 NO. 601.1.

DEMKO
EN 60601-1

EEC Safety Compliance:
These display units meet the requirements of EN-60601-1 so as to conform to the Medical Device Directive 93/42/EEC (general safety information).

Note: The Ⓓ mark does not apply to the Radiance 37, 42 and 52 displays.

Note: The mark applies to the Radiance 42 and 52 displays.

The displays covered by this manual are Class 1 medical devices.

These monitors are powered by AC voltage from 100 to 240 volts at 50 to 60Hz.
Monitor is intended for continuous operation.

It is the responsibility of the installer to test the display's earth ground to verify that it complies with the hospital, local and national impedance requirements.

A ground post, located on the back of the display, may be used for the purpose of grounding the display's chassis. Any such ground must be installed in accordance with applicable electrical codes. The ground post is shown on the mechanical drawing found on page 2.

This equipment **may not** be used in the presence of flammable anesthetics mixture with air, oxygen or nitrous oxide.

Recycling:

Follow local governing ordinances and recycling plans regarding the recycling or disposal of this equipment.

Declarations of Conformity

FCC and Council Directives of European Standards:
This device complies with Part 15 of FCC rules and 93/42/EEC of the Council Directives of European Standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable results.

1. Use the attached specified cables with the color monitor so as not to interfere with radio and television reception. Use of other cable and adapters may cause interference with other electronic equipment.
2. This equipment has been tested and found to comply with the limits pursuant to FCC part 15 and CISPR 11. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

IEC:
This equipment has been tested and found to comply with the limits for medical devices to the IEC 60601-1-2:2001. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

FCC, Council Directives of European Standards and IEC:
There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- 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 your dealer or an experienced radio/TV technician for help.

Accessory equipment connected to this monitor must be certified according to the respective IEC Standards (i.e., IEC 60950-1 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standard, IEC 60601-1-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of system standard IEC 60601-1-1. Whoever is responsible for securing the monitor to a system needs to insure that the mounting equipment used with this display complies to IEC standard 60601-1. If in doubt, consult the technical services department or your local representative.

Limited Warranty

NDS Surgical Imaging (hereinafter "NDS") warrants this product to be free from defects in material and workmanship and, subject to the conditions set forth below, agrees to repair or replace any part of the enclosed unit other than the LCD backlight, which proves defective for a period of three (3) years from the date of first purchase or 10,000 hours of operation whichever comes first. Spare parts are warranted for ninety (90) days.

This warranty is limited to the original purchaser of the product and is not transferable. This warranty covers only NDS supplied components. Service required as a result of third party components is not covered under this warranty. Proof of Purchase will be required by NDS to substantiate date of purchase. Such proof of purchase must be an original bill of sale or receipt containing the name and address of the seller and the purchaser and the serial number of the product.

It shall be your obligation and expense to have the product shipped, freight prepaid, or delivered to the authorized reseller from whom it was purchased, or other facility authorized by NDS to render services provided hereunder, in the original package. All products returned to NDS for service MUST have prior approval which may be obtained by contacting the factory. The product shall not have been previously altered, repaired, opened or serviced by anyone other than a service facility authorized by NDS to render such service. The serial number of the product shall not have been altered or removed. In order to be covered by this warranty, the product shall not have been subjected to displaying of fixed images for long periods of time, resulting in image persistence (afterimage effects), accident, misuse or abuse or operation contrary to the instructions contained in the User's Manual. Any such conditions will void this warranty.

NDS SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR OTHER TYPES OF DAMAGES RESULTING FROM THE USE OF ANY NDS PRODUCT OTHER THAN THE LIABILITY STATED ABOVE. THESE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The product is warranted in accordance with the terms of this limited warranty. Consumers are cautioned that system configuration, software, the application, customer data and operator control of the system, among other factors, affect the product performance. While NDS products are considered to be compatible with many systems, specific functional implementation by the customers of the product may vary. Therefore, suitability of a product for a specific purpose or application must be determined by consumer and is not warranted by NDS.

About This Manual

This manual is designed to assist the user with proper installation, setup and operation of the Radiance Medical LCD display. Depending on the model and options that were purchased, some of the features and options in this manual may not apply to the display you are using.

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A black numbered tab on the side of the page denotes the beginning of a section.

The functional descriptions in this manual are representative of:
Part Number: 90R0011, 90R0016 & 90R0027
Firmware BIOS: 58H0007 Version A and later.

Part Number: 90R0017
Firmware BIOS: 58H0013 Version A and later.

Due to the technology utilized to manufacture flat-panel screens, characters will appear crisper with sharper edges than that of a computer CRT. For the same reason, live video may appear a little blocky. Users not familiar with the image differences should familiarize themselves before utilization in a critical application and determine its usability.

For mission critical applications, we strongly recommend that a replacement unit be immediately available.

Manual Part Number: 60G0127 Rev G

Installation

It is the responsibility of the system integrator or installer to insure that the mounting system is robust enough to support the weight of the display. The weights of the displays covered by this manual are in the specifications table on page 21.

Quick Startup

Powering On The Unit:

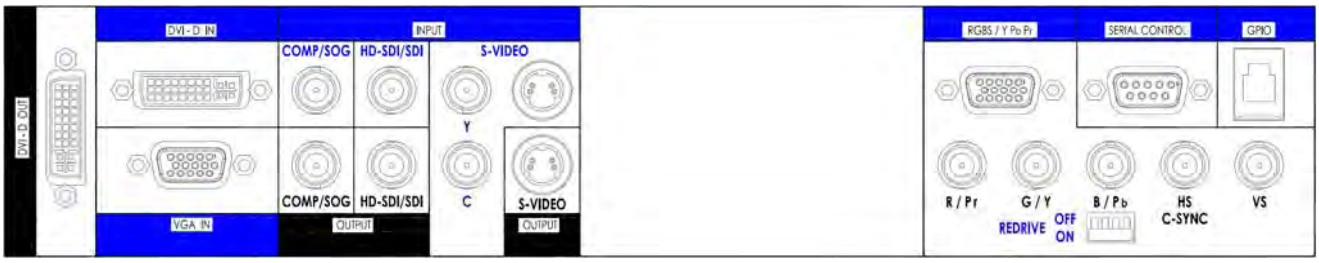
Connect the AC power to the display via the power cord. Connect the video source to the Radiance display. Apply power to the peripheral device, then to the display. The NDS logo is displayed, followed shortly by video.

The electronics, designed by NDS, incorporates proprietary SmartSync™ technology which at initialization, examines the incoming signal and automatically displays the video image in its proper format. This eliminates adjustments for most video sources. To fine tune the image, please refer to "Image Adjustments" on page 3.

First time users and initial test:

Visually, Flat-Panel (LCD) images will look crisper than those of a traditional CRT. It is recommended that first time users view the display next to a CRT to familiarize themselves with any subtle differences in viewing quality.

Connector Panel



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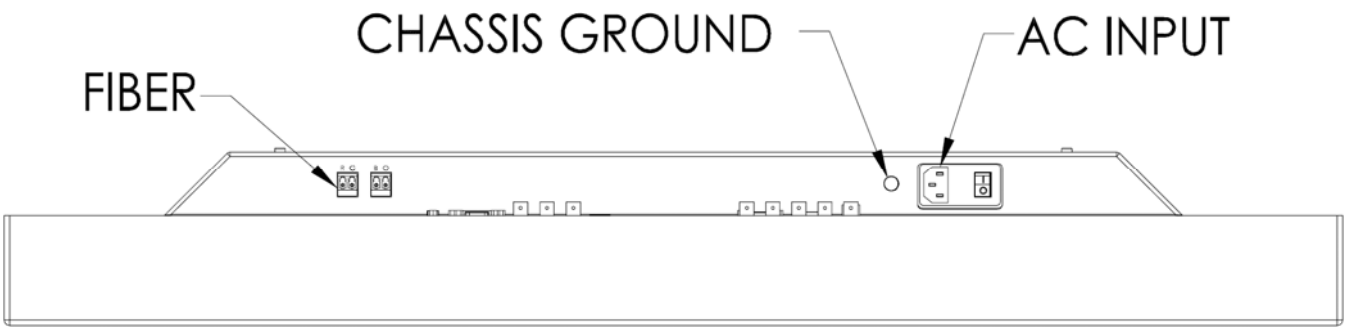
Notes

1. An S-Video signal may be applied via 2 BNC terminated cables to the Y and C labeled BNC connectors or a DIN 4 terminated cable, but not both.
2. RGBS and YPbPr signals may be applied via the HD-15 connector or the R/Pr, G/Y, B/Pb and CSYNC BNC connectors.
3. Set the REDRIVE switch to Off when the RGBS and YPbPr signals will not be daisy chained to another display. The REDRIVE switch is set to On when the RGBS and YPbPr signals will be daisy chained to a second display.
4. DVI, Comp/SOG, HD-SDI/ SDI and S-Video redrives are always active.
5. The Fiber Optic and DVI inputs may not be used simultaneously.



Electrical Symbols

Equipotentiality:
This symbol appears next to the display's Potential Equalization Conductor. (ground post)

Open (Off) Switch:
This symbol appears on the open, or off, side of the display's rocker switch.

Closed (On) Switch:
This symbol appears on the closed, or on, side of the display's rocker switch.

Control

A 6 button keypad, located on the front of the display in the bottom right corner, allows the user to make adjustments to various display parameters using the On Screen Menus (OSM) system.

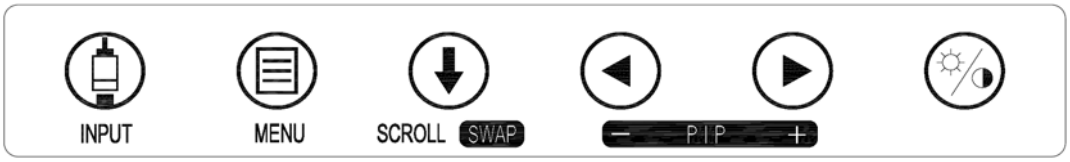


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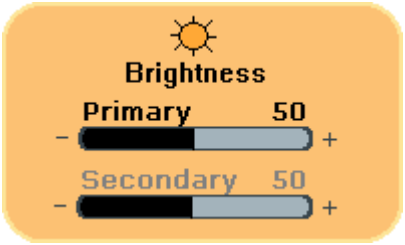
Image Adjustments

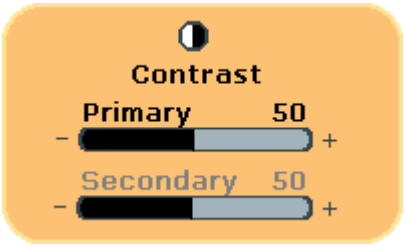
Adjust Brightness



Press the Brightness / Contrast button to display the Brightness control menu. Press the ◄ or ► button to adjust Primary brightness. When a PIP image is visible, press the Brightness / Contrast button again to access the Secondary brightness control.

Setting the brightness too high or too low will decrease the amount of visible grayscales.

Adjust Contrast



Press the Brightness / Contrast button twice, three times when a PIP image is visble, to display the Contrast control menu. Press the ◄ or ► button to adjust Primary contrast. When a PIP image is visible, press the Brightness / Contrast button again to access the Secondary contrast control.

Setting the contrast too high or too low causes loss of some grayscales. Color saturation may appear incorrect.

Adjust Backlight

Press the Brightness / Contrast button three times, five times when a PIP image is visible, to display the Backlight control. Press the ◄ or ► button to set the backlighting.

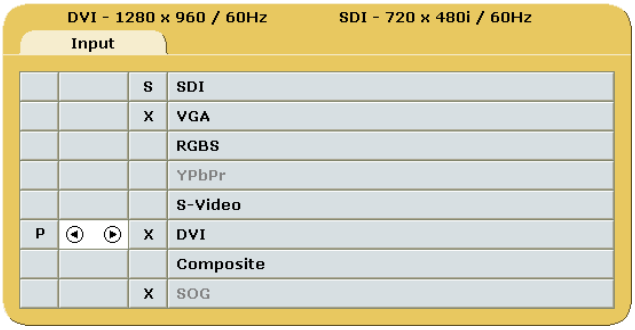
Note: Lowering the backlight level will increase the backlight lifetime.

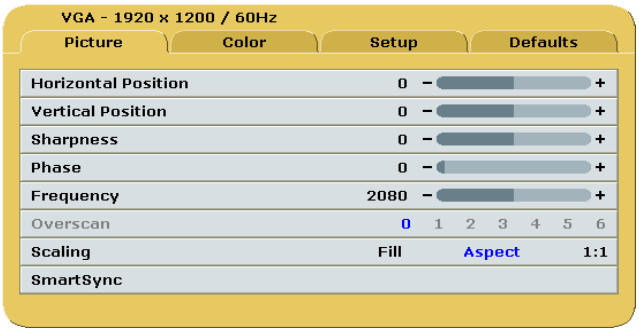
Menu Systems Overview

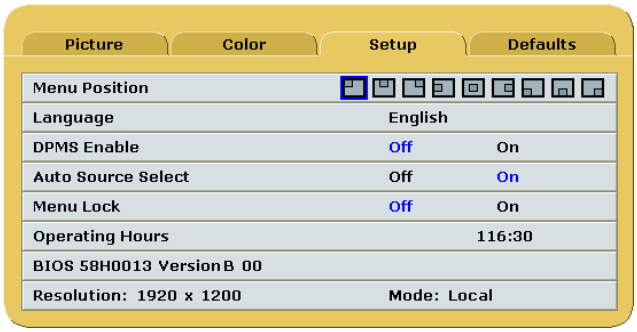
Press the MENU button once to open the Menu System. The current video input is shown in the Display Mode tab on the top right of the menu. The Menu System opens with Picture menu displayed. Press the ◄ or ► button to select the menu you want to work with, then press the SCROLL button to select the parameter. Press the ◄ or ►button to set the parameter to the desired value. Press the MENU button to save your changes and close the Menu System.

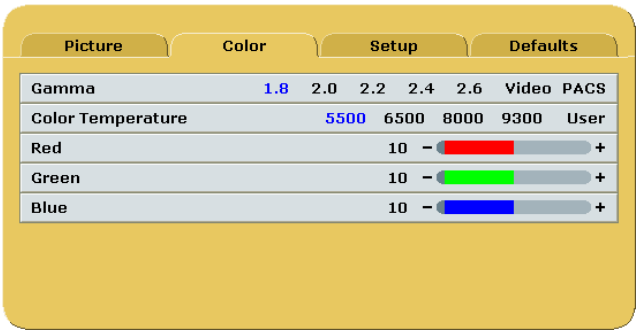
Notes:

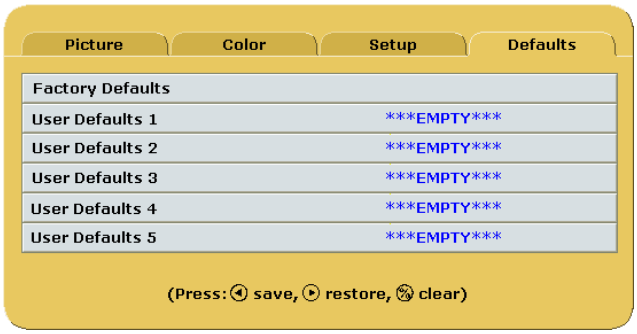
1. All parameter names change to the language selected in the Setup Menu.
2. Grayed out parameters are not accessible.









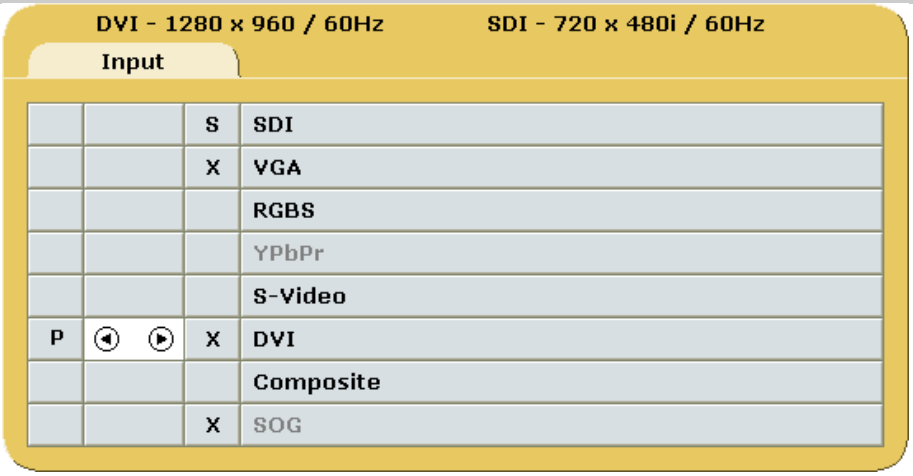


Language List:

English
Deutsch
Francais
Italiano
Svensk
Espanol
Nederlands

Video Source

Inputs Menu



When the display is powered on Auto Source Select looks at the previously selected video source first. If a signal is present it is displayed, otherwise Auto Source Select starts scanning the inputs for a signal. The Input menu will automatically turn off 30 seconds after the most recent button press. It may also be turned off by pressing the Input button.

To switch to a different input source, press the INPUT button to open the input menu. The Input menu shows a: **P** for primary input in the left most column and an: **S** for secondary input in the column to the right of the cursor. Press the SCROLL button to highlight the desired input. Finally, press ◄ button to make it the primary input or press ► to make it the secondary input. The Secondary input may be cleared by highlighting it using the SCROLL button and pressing the ► button. Selecting a secondary input is optional.

Inputs with an **X** in the secondary column may not be designated as the secondary input. The table below shows which inputs may be secondary when a given input is primary

RGBS and YPbPr share the same input connectors, thus whichever is selected the other will be grayed out. The same is true for Composite and SOG. YPbPr and SOG are initially grayed out.

		Secondary Input										
		SDI	HD-SDI	RGBS-SD	RGBS-HR	YPbPr-SD	YPbPr-HR	S-video	Composite	VGA	DVI-d	SOG
Primary Input	SDI			✓	✓	✓	✓			✓	✓	✓
	HD-SDI			✓				✓	✓			
	RGBS-SD	✓	✓							✓	✓	✓
	RGBS-HD	✓						✓	✓			
	YPbPr-SD	✓	✓							✓	✓	✓
	YPbPr-HD	✓						✓	✓			
	S-video	✓	✓	✓	✓	✓	✓			✓	✓	✓
	Composite	✓	✓	✓	✓	✓	✓			✓	✓	
	VGA	✓		✓		✓		✓	✓			
	DVI-d	✓		✓		✓		✓	✓			
	SOG	✓		✓		✓		✓				

PIP and Swap

Selecting a secondary input displays a small image of the data connected to secondary source in the upper right corner of the display.

Secondary Image Size Control
The size of the secondary image is controlled by pressing ◄ or ► buttons. Pressing the ► button will cycle through:

Small = ~ 25% of Primary height in upper right corner.
Medium = ~ 40% of Primary height in upper right corner.
Half = Primary and Secondary appear at equal height side by side, secondary on the right side.
Expanded = Primary and Secondary are equal height side by side, but expanded somewhat.
None = No secondary image displayed.

The images at the bottom of the page illustrate the above sequence.

Pressing the ◄ button will cycle through the above sizes in reverse order.

Pressing the SCROLL / SWAP button will exchange the primary and secondary inputs, and exchange their respective locations on the display. Pressing the button a second time will restore the inputs to their original primary/secondary status. It is not necessary for both images to be displayed in order to swap primary and secondary images.

The swap operation is different when the primary input is: S-Video or Composite and the secondary input is: SD-SDI, SD-RGBS or SD-YPbPr. In this case, pressing the SWAP button will cause the secondary image to be displayed full size, the primary image will not be displayed. Pressing the SWAP button again will restore the primary and secondary images to their original sizes and positions.

Secondary image size and image swapping may also be controlled via the GPIO port. GPIO details are on page 7 and the GPIO connector pin out is described on page 20.

Small

Medium

Half

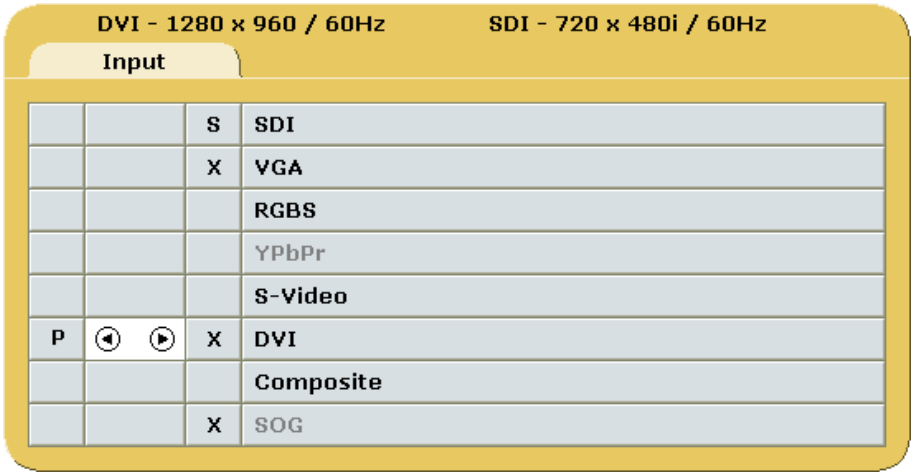
Expanded

None

GPIO

General Purpose Input Output (GPIO):
The GPIO control allows the user to step through the Secondary image sizes as described on page 6, swap the Primary and Secondary images or display a Record indicator in the upper left corner of the display.

Refer to the Input Menu shown below when setting up the Primary and Secondary inputs.



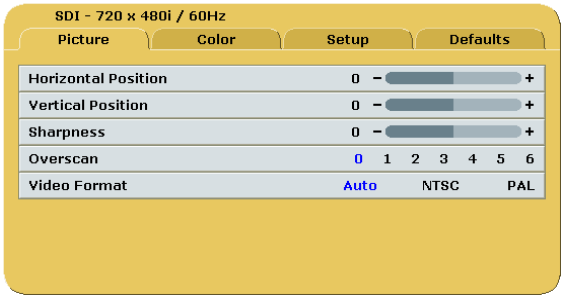
GPIO Primary / Secondary Source Setup:
1. Open the Input Menu
2. Press the SCROLL button to highlight the input that will be designated as Primary.
3. Select it by pressing the ◄ button a **P** appears in the column to the left of the cursor**.**
4. After the Primary input is chosen you may designate a Secondary input.
5. Press the SCROLL button to highlight the input that will be designated as Secondary.
6. Select it by pressing the ►button an **S** appears in the column to the right of the cursor. A small image of the signal connected to the Secondary input appears in the upper right corner of the Primary input.
7. The Secondary input may be cleared by highlighting it using the SCROLL button and pressing the ► button.

Using GPIO Source Selection:
1. Connect an appropriately wired fixture to the GPIO connector.
2. Press the fixture's PIP Size button.
3. The display's Secondary image increases in size. See page 6 for the sequence.
4. Press the fixture's Swap button. The Primary and Secondary images swap locations
5. Press the fixture's Record button, the Record indicator is displayed until the Record button is released.

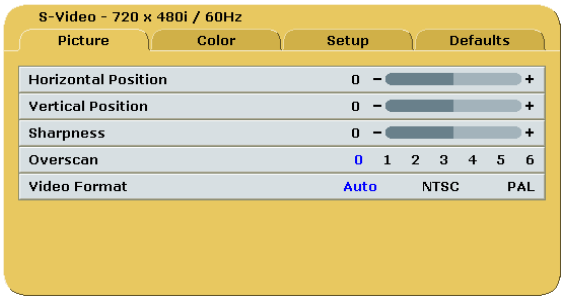
Note: GPIO connector pin out is on page 20.

Setting Up the Display

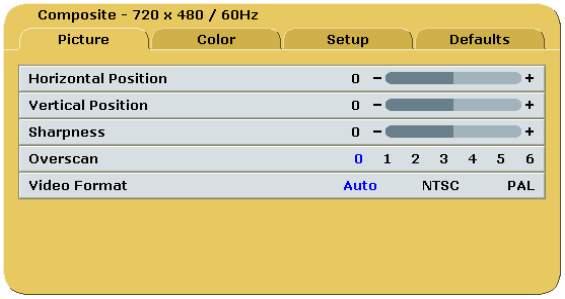
SDI Picture Menu



S-Video Picture Menu



Composite Picture



Horizontal Position

Moves the image to the left or right. Press ◄ or ► to horizontally center the image.

Vertical Position

Moves the image up or down. Press ◄ or ► to vertically center the image.

Sharpness

Press ◄ or ► to adjust the sharpness (focus) of the displayed image.

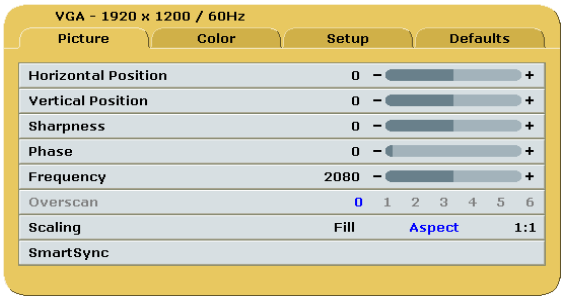
Overscan

0 = The picture is displayed at the maximum size that will fit on the screen without losing video information. Picture may have black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = Stretch the picture in proportional steps until the screen is filled. The picture's aspect ratio is not changed. Some video information may be lost. Select using ◄ or ► buttons.

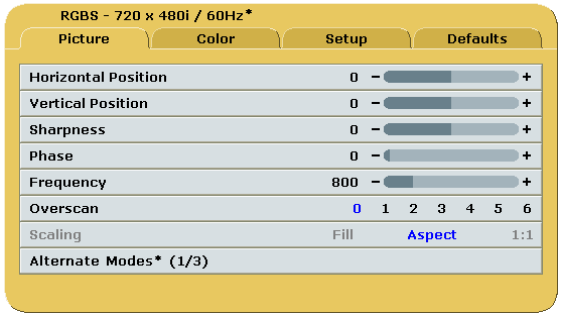
Video Format

auto = Automatically sets the unit to the format of the connected video source. **ntsc** = Sets the unit to accept NTSC video. **pal** = Sets the unit to accept PAL video. Select using ◄ or ► buttons.

VGA / SOG Picture Menu



RGBS / YPbPr Picture Menu



Horizontal Position
Moves the image to the left or right. Press ◄ or ► to horizontally center the image.

Vertical Position
Moves the image up or down. Press ◄ or ► to vertically center the image.

Sharpness
Press ◄ or ► to adjust the sharpness (focus) of the displayed image. **Note:** When the VGA input is active Sharpness cannot be adjusted when the display is operating at native resolution.

Phase
Press ◄ or ► to adjust the phase of the display's pixel clock.

Frequency
Adjusts the frequency of the display's pixel clock. With Scaling set to **Fill** adjust until image just fills the screen horizontally. Press ◄ or ► to adjust the frequency of the display's pixel clock.

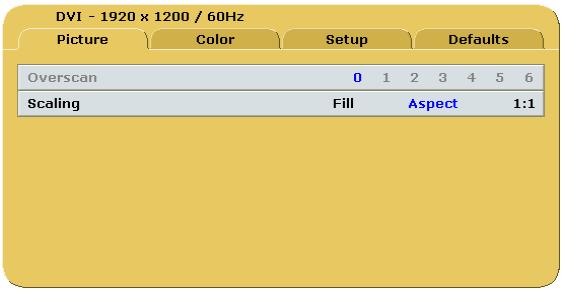
Scaling (Graphics)
This parameter is enabled when the input is graphics (computer) data.
Fill = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed.
Aspect = Expands the video image until its largest dimension fills the screen. Image may be displayed with black bars on the top and bottom or the left and right. **1:1** = Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◄ or ► buttons.

Overscan (Video)
This parameter is enabled when the input is video (camera) data.
0 = The picture is displayed at the maximum size that will fit on the screen without losing video information. Picture may have black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = Stretch the picture in proportional steps until the screen is filled. The picture's aspect ratio is not changed. Some video information may be lost. Select using ◄ or ► buttons.

SmartSync™
On initialization NDS' proprietary SmartSync™ technology examines the incoming signal and automatically displays the video image in its proper format. To run select SmartSync™ and press the ►button.

Alternate Modes (58H0007 Version D and later, 58H0013 Version A and later)
When the input is VGA, RGBS or YPbPr alternate modes (formats) may be available. When they are the SmartSync parameter is replaced with Alternate Modes* (X/Y) where X is the selected mode and Y is the maximum number of modes available. The mode increments each time the ► button is pressed until the selected mode equals the maximum available, the next time ► pressed the first mode is restored.

DVI Digital Picture Menu



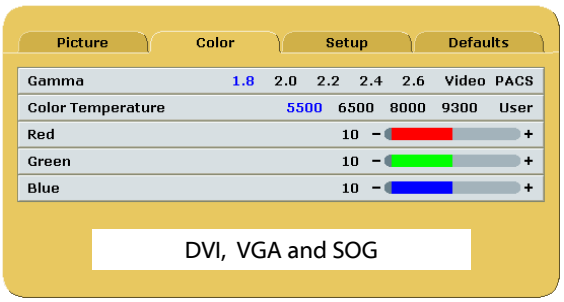
Overscan (Video)

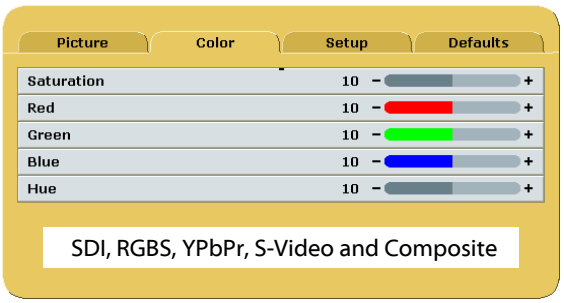
This parameter is enabled when the input is video (camera) data.
0 = The picture is displayed at the maximum size that will fit on the screen without losing video information. Picture may have black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = Stretch the picture in proportional steps until the screen is filled. The picture's aspect ratio is not changed. Some video information may be lost. Select using ◄ or ► buttons.

Scaling (Graphics)

This parameter is enabled when the input is graphics (computer) data.
Fill = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed.
Aspect = Expands the video image until its largest dimension fills the screen. Image may be displayed with black bars on the top and bottom or the left and right. **1:1 =** Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◄ or ► buttons.

Color Menus





Gamma (DVI, VGA and SOG)

Press ◄ or ►to select a preset Gamma, Video or PACS

Notes:

1. Video is a color corrected Look Up Table (LUT) available with DVI, VGA and SOG.
2. Picture Archive Communications System (PACS) is a DICOM-like LUT available with DVI, VGA and SOG.
3. Video is not available when the input is SOG.

Color Temperature

Press the ◄ or ► button to select one of the four preset color temperatures or User. Selecting User allows you to individually adjust the values of Red, Green and Blue.

Saturation (SDI, RGBS, YPbPr, S-Video and Composite)

Press ◄ or ► to set the saturation (color intensity) of the image.

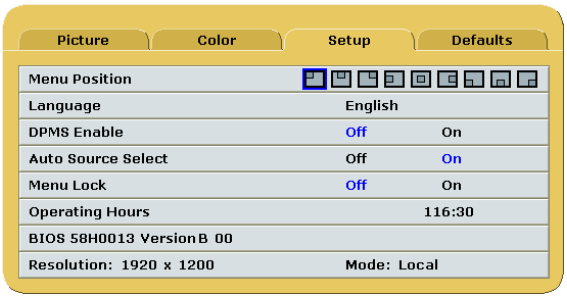
Red, Green, Blue (All)

Press the ◄ or ► button to increase or decrease the intensity of the selected color.

Hue (SDI, RGBS, YPbPr, S-Video and Composite)

Press ◄ or ► to set the hue (color tint) of the image.

Setup Menu



Menu Position
Places the menu in 1 of 9 predefined screen positions. Press the ◄ or ►button to select any of the 9 screen positions.

Language
Selects 1 of 7 languages: English, Deutsch, Francais, Italiano, Scandinavia, Espanol or Dutch. Press the ◄ or ► button to select any of the 7 languages.

DPMS Enable
Display Power Management System. When DPMS is enabled (on), and no input signal is present, an "Entering Power-Save Mode" message is displayed for 10 - 15 seconds, after which the display shuts down. This prolongs the life of the backlight tubes in the display. The display turns on when the input signal is restored. Press the ► button to enable DPMS, press the ◄ button to disable DPMS.

Auto Source Select
on = Searches through all possible input sources until an active video source is found. **off** = Video input is manually selected. Press the ◄ or ►button to disable or enable Auto Source Select.

Menu Lock
Disables access to menu system. This prevents inadvertent changes to the display's settings. To enable Menu Lock, press the ► button. MENU LOCKED is displayed when the ► button is pressed. To unlock, simultaneously press and hold the MENU and SCROLL buttons until MENU UNLOCKED is displayed.

Operating Hours: Backlight hours of operation.
BIOS: Version of the display's BIOS firmware.

BIOS 58H0007 Version D and later, 58H0013 Version A and later:
Resolution: = Output resolution of a connected NDS OR Integration product. Default value is: 1920 x 1200.
Mode:
Local = The display's keypad controls the display.
Remote = Allows the display's keypad to control an NDS OR Integration product. When the display is in remote mode the output of its keypad is redirected to its RS-232 port and has no effect on the display.

Mode Setting:
Local: Turn the display off**.** Press and hold the INPUT button, then turn the display on. Continue to hold the INPUT button until the NDS logo appears, "Mode: Local" message should appear under the logo.

Remote: Turn the display off**.** Press and hold the MENU button, then turn the display on. Continue to hold the MENU button until the NDS logo appears, "Mode: Remote" message should appear under the logo. Connect the display to the connect OR using an NDS 35Z0009 Serial Cable or equivalent

Note: Once a mode has been selected the display remains in that mode until it is explicitly placed in the other mode, using the techniques described above.

Defaults Menu

Factory Defaults

Displays Restoring Factory Defaults message and returns all settings to their factory preset values. Press the SCROLL button to highlight Factory Defaults, then press the ► button.
Note: Restoring Factory Defaults takes **60** to **75** seconds.

User Defaults

Allows up to five customized user settings to be saved.

Setting User Defaults

1. Set the Picture, Color and Setup parameters to the user's preferences.
2. Select the Defaults tab.
3. Use the SCROLL button to select an available User Defaults. ***EMPTY*** appears in available User Defaults.
4. Press the ◄ to save the user's settings. The ***EMPTY*** message will be removed, see User Defaults 1 in the above OSM illustration.
5. Repeat steps 1 thru 4 for up to 5 users.

Restoring User Defaults

1. Select the User Defaults to be restored, then press the ► button .

Clearing User Defaults

1. Select the User Defaults to be cleared, then press the Brightness / Contrast button .

Note: The prompt at the bottom of the Defaults menu appears only when one of the User Defaults is selected.

Troubleshooting Section

Image Size is Very Large for the Screen
If the computer data does not appear to be the correct format, then SmartSync™ must be run. To run SmartSync™, press the Menu button. Select the Setup menu. Press SCROLL to highlight SmartSync™ , then press the ► button. SmartSync™ will run and size the image properly.

Ghosting in Characters
Ghosting in characters is usually attributed to reflections in the video cable or source. Use a high quality coaxial cable and, if possible, lower the vertical refresh rate. Lower scan rates can help eliminate reflections. Unlike a CRT a flat-panel will not flicker at lower refresh rates (60 Hz is optimal) and data update will be the same at all refresh rates.

Text is Too Small
Since the monitor accepts and displays computer data with a higher resolution than the display's native resolution, this may produce small text. In the Menu check the Display Mode tab. Verify that the computer data resolution does not exceed the Native Resolution specification shown on page 21.

Character Jitter
If text characters seem to be "shaky" or bold, then Sharpness, Frequency and / or Phase may require adjusting. See: *Setting Frequency, Phase and Sharpness* below.

Character Noise and Vertical Distortion
The Frequency adjustment expands or contracts the horizontal size of the displayed image. The displayed image may be too wide or too narrow and vertical banding and pixel jitter may appear in grays and light colors. Adjust the Frequency until the image just fits the screen. Horizontal position adjustment can be used to verify that Frequency is set correctly. Line up the image on the left edge of the screen and then shift by one "click" to the right. The image should have one column off the screen on the right side if the Frequency is set correctly.

Black Screen
Power the display Off and On. If the NDS logo appears then the display is working properly. Check if the power management feature (DPMS) is enabled. An "Out of Range" message appears in the upper left hand corner when an input source is out of the display's resolution range. A "Searching" message appears in the lower right hand corner when the video source is not present.

Setting Frequency, Phase and Sharpness
Windows Users: Open a WordPad document and set the font to Arial 8. Press the enter key to move the cursor to the middle of the page. Hold the shift and + keys down to create a line of +s.

If the + signs appear in groups of light or dark, then the Frequency is not correct. Press the MENU button to open the OSM, then SCROLL to the Frequency parameter. Press the ◄ or ► buttons to increase or decrease Frequency. There will be a point were all the + signs snap into focus and are the same intensity.

Phase and Sharpness are subtle adjustments and are best set using a display calibration program.

Keypad Doesn't Control the Display
If thekeypad does not control the display, verify the display is in local mode. See page 12.

Drawings and Dimensions

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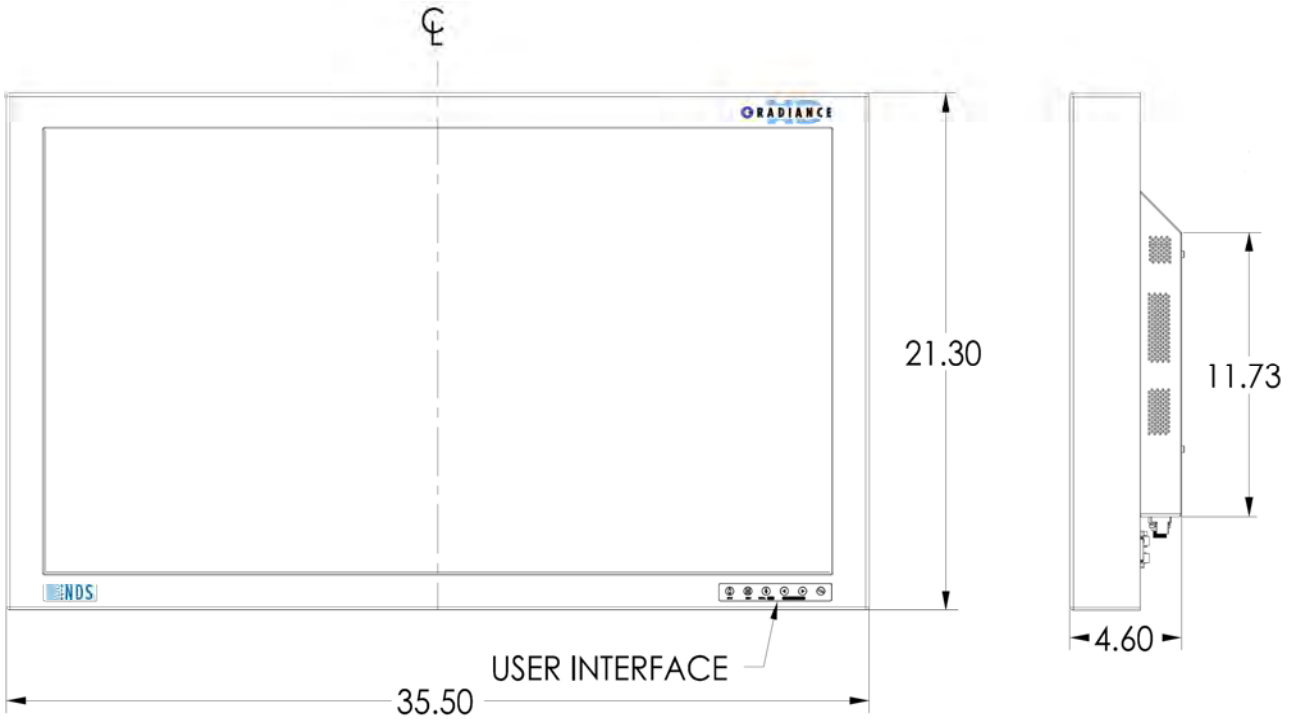
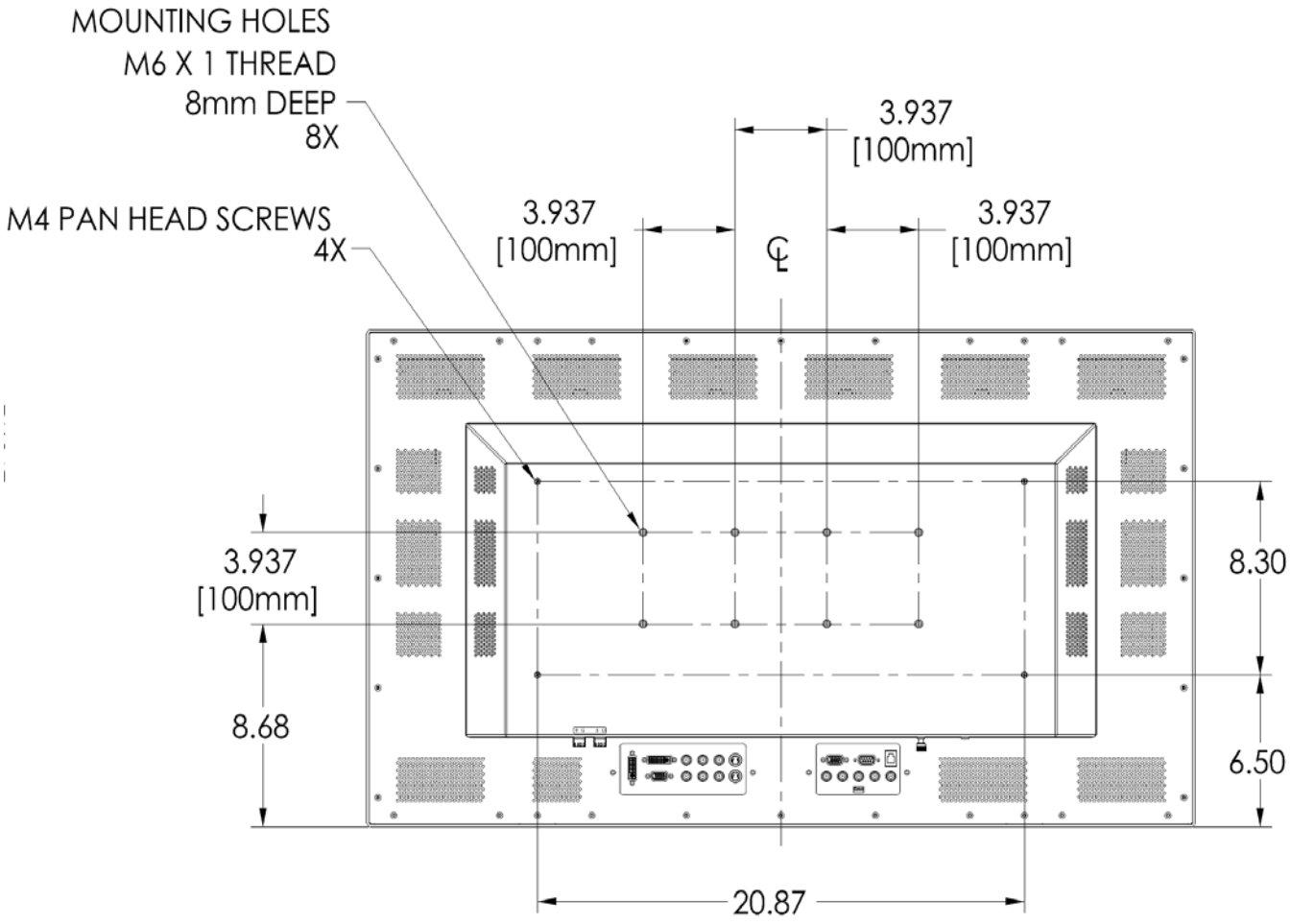
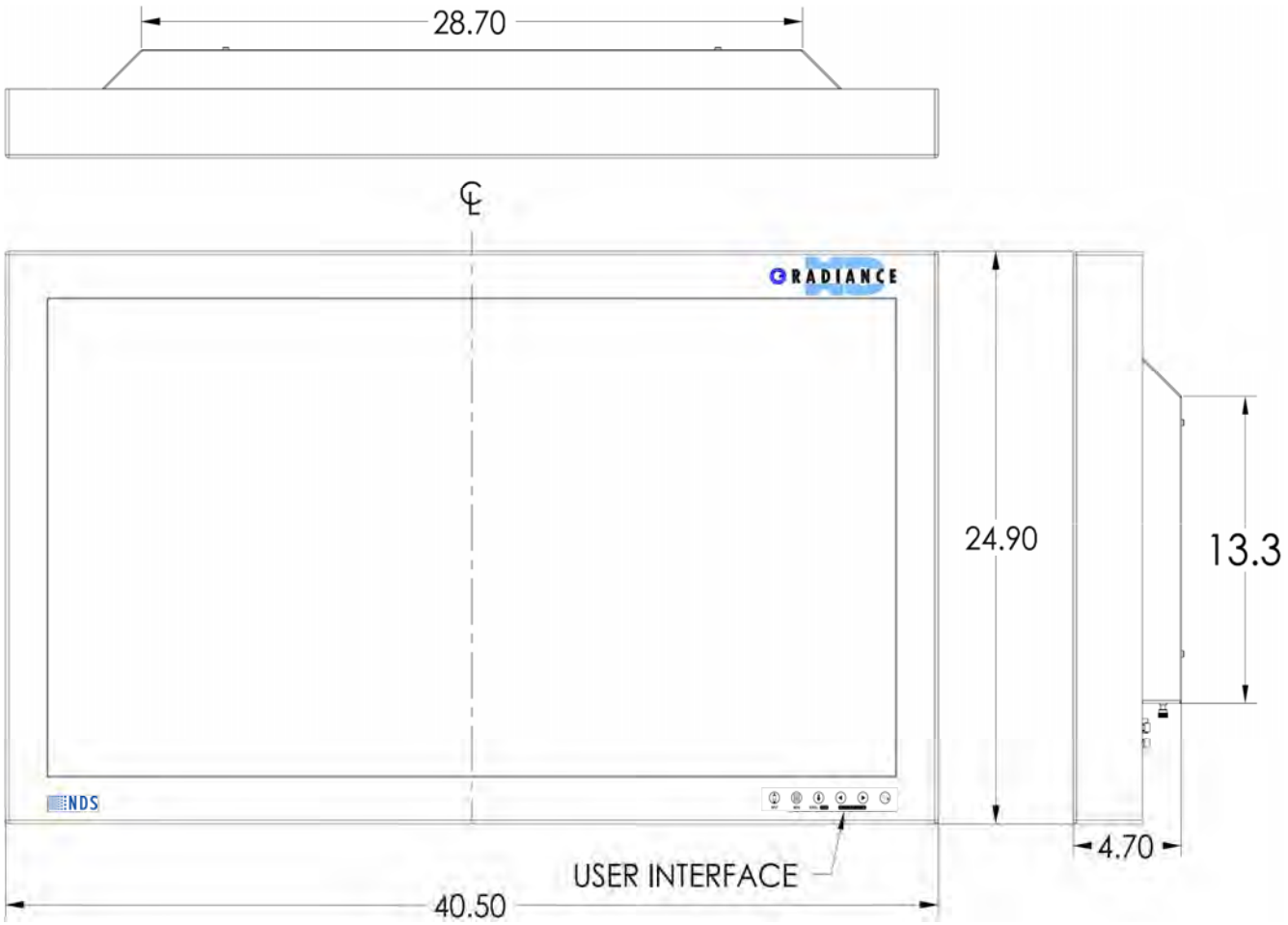
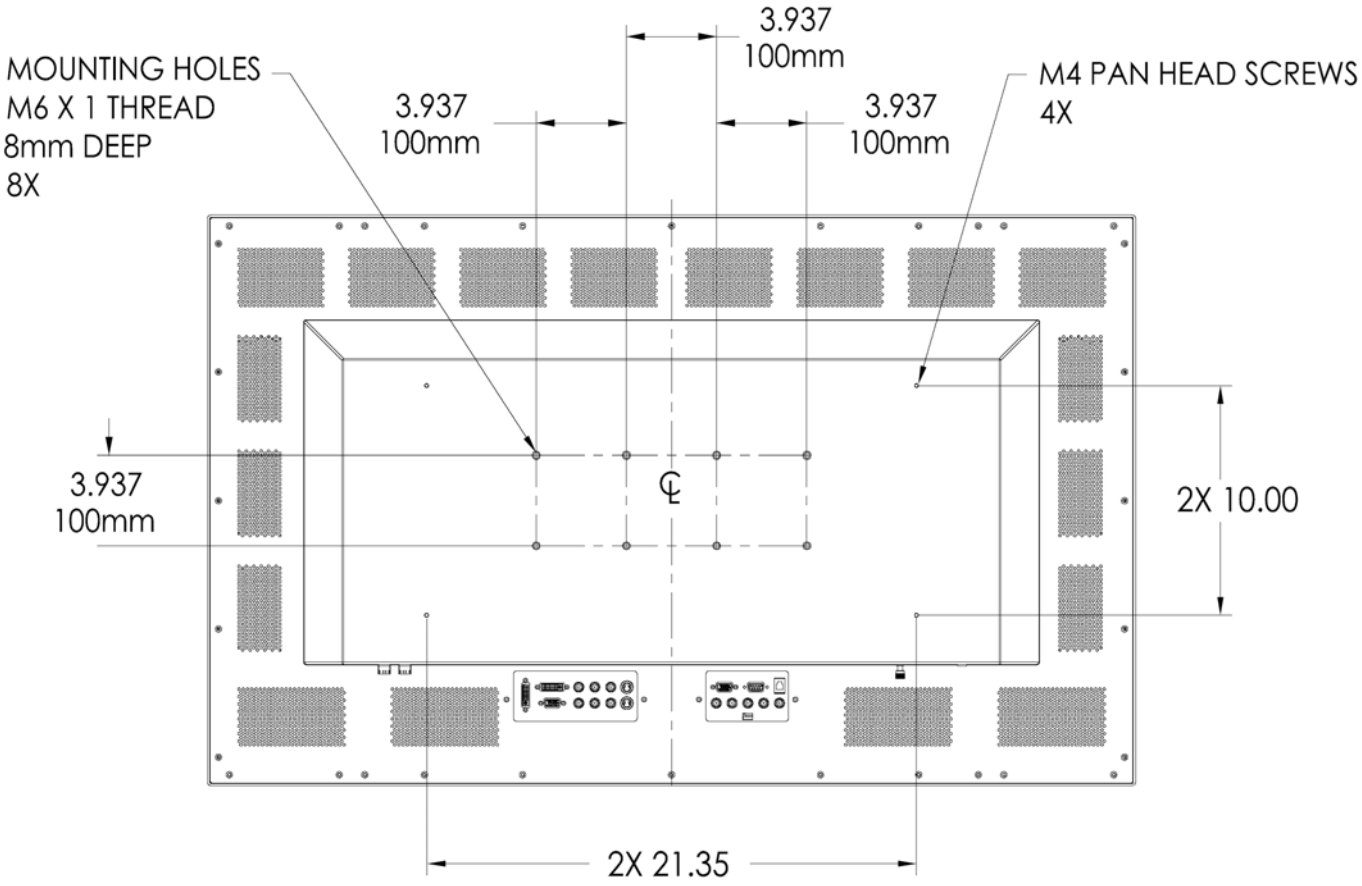
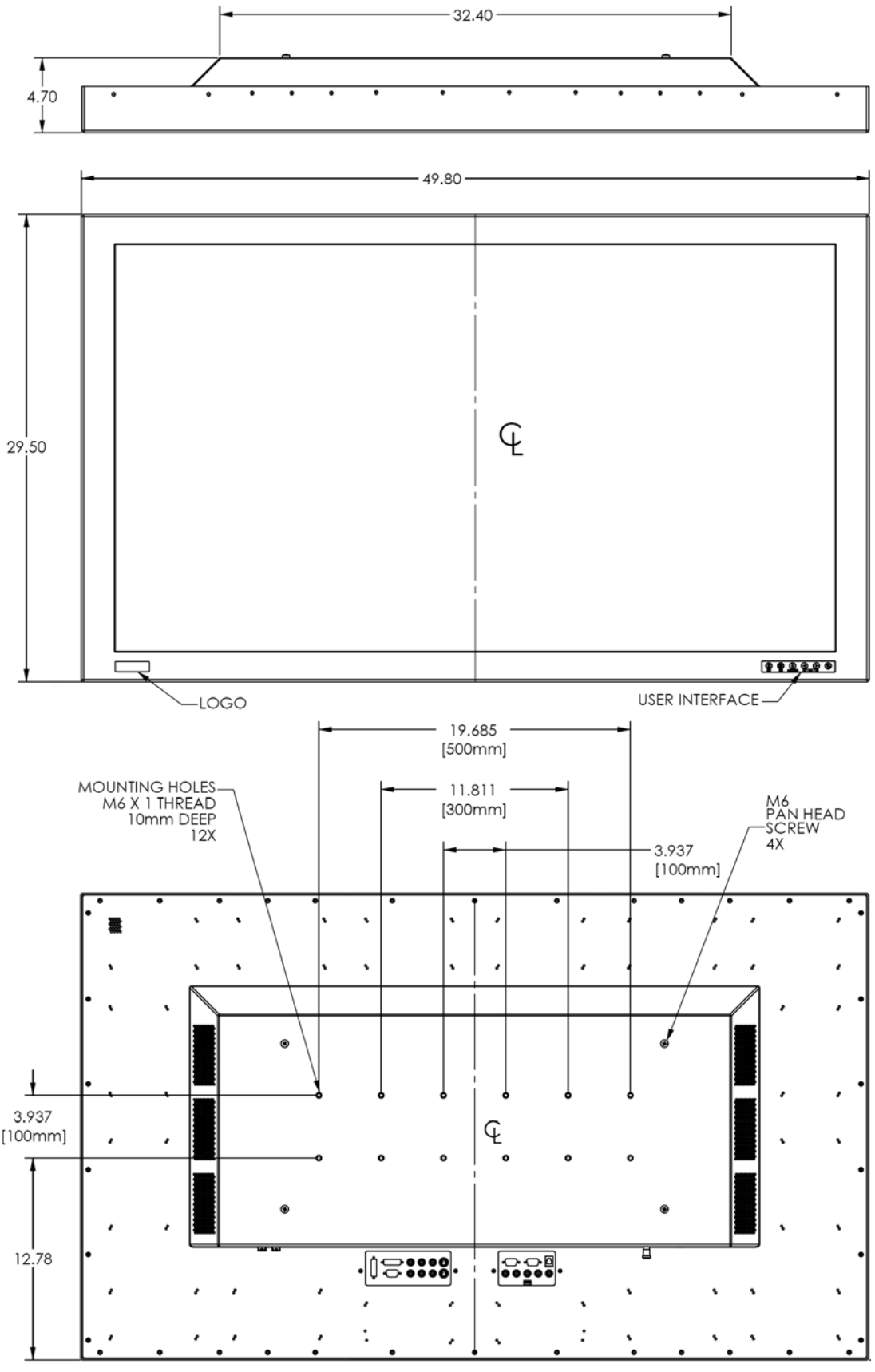
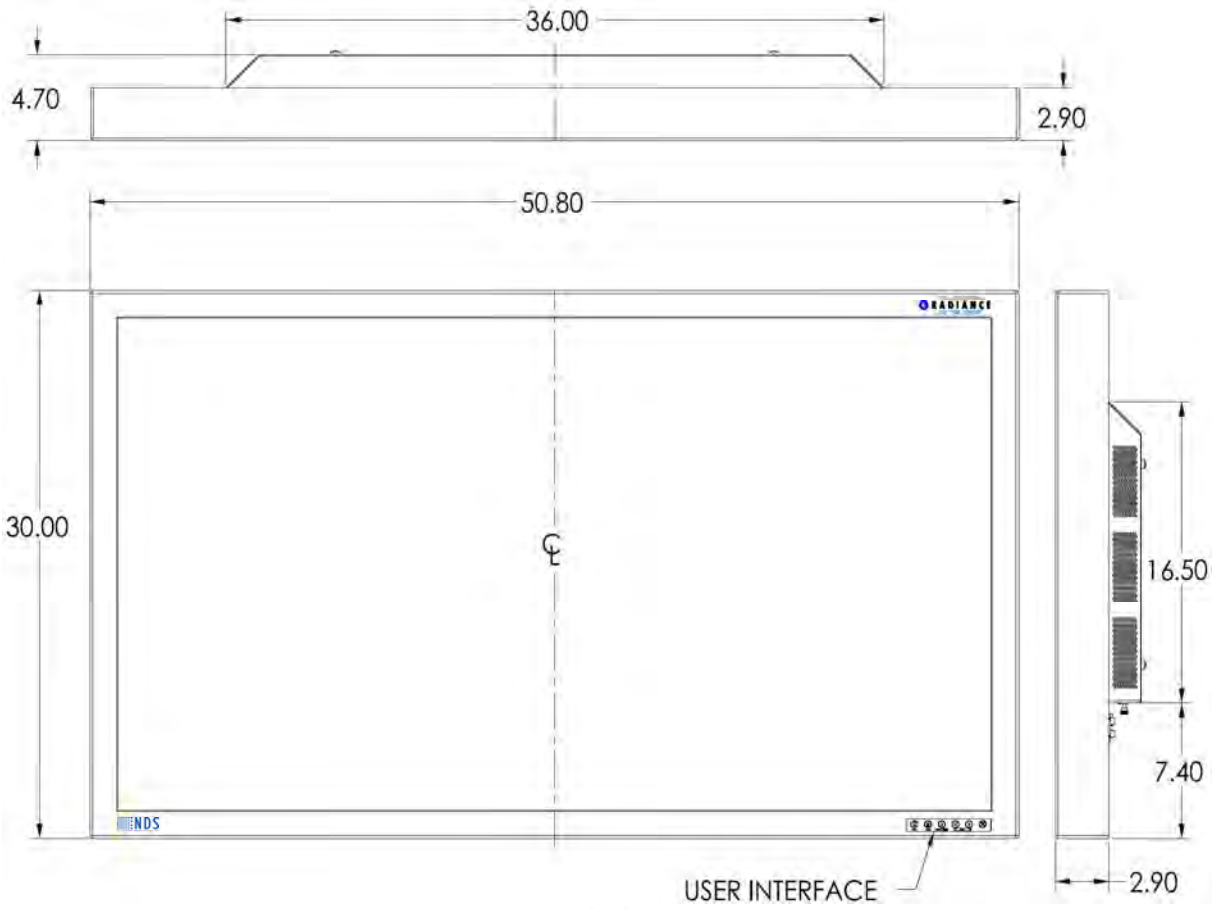


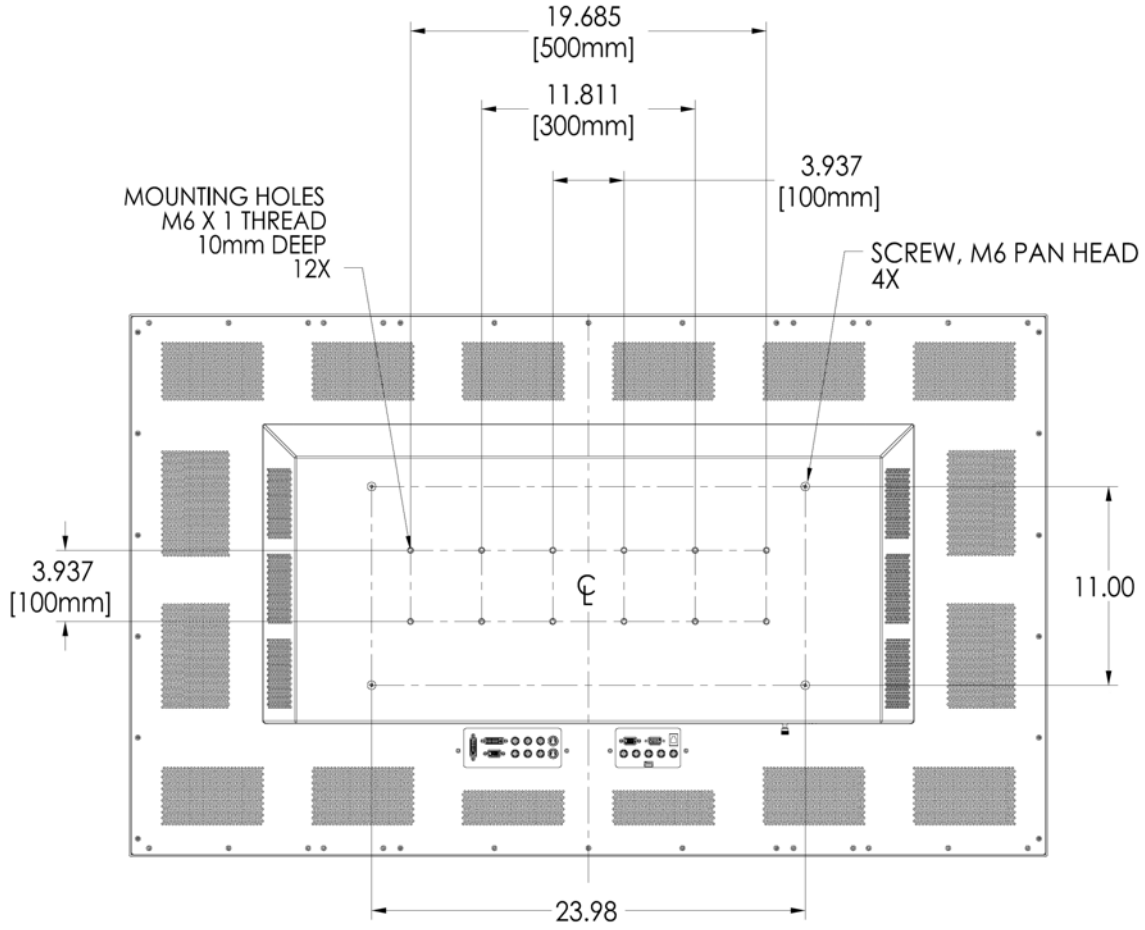



28.70
RADIANCE
NDS
24.90
13.3
4.70
USER INTERFACE
40.50

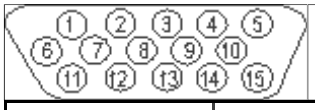

MOUNTING HOLES
M6 X 1 THREAD
8mm DEEP
8X
3.937
100mm
3.937
100mm
3.937
100mm
M4 PAN HEAD SCREWS
4X
3.937
100mm
2X 10.00
2X 21.35


32.40
4.70
49.80
29.50
LOGO
USER INTERFACE
19.685
[500mm]
11.811
[300mm]
3.937
[100mm]
MOUNTING HOLES
M6 X 1 THREAD
10mm DEEP
12X
M6
PAN HEAD
SCREW
4X
3.937
[100mm]
12.78


36.00
4.70
2.90
50.80
30.00
16.50
7.40
2.90
USER INTERFACE

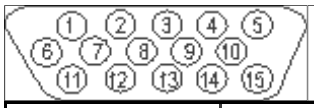

19.685
[500mm]
11.811
[300mm]
3.937
[100mm]
MOUNTING HOLES
M6 X 1 THREAD
10mm DEEP
12X
SCREW, M6 PAN HEAD
4X
3.937
[100mm]
11.00
23.98

Data Connectors and Pin Outs



RGBS / YPbPr

1 RED	6 GND RED	11 N. C.
2 GREEN	7 GND GREEN	12 N. C.
3 BLUE	8 GND BLUE	13 C. Sync / H. Sync.
4 N. C.	9 N. C.	14 V. Sync.
5 GND TEST	10 GND	15 N. C.



VGA

1 RED	6 GND RED	11 ID0
2 GREEN	7 GND GREEN	12 ID1
3 BLUE	8 GND BLUE	13 HORIZ SYNC
4 ID2	9 N. C.	14 VERT SYNC.
5 GND	10 SYNC GND	15 ID3

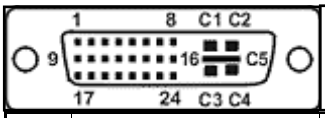
S-Video

Pin	Name	Description
1	GND	Ground (Y)
2	GND	Ground (C)
3	Y	Intensity (Luminance)
4	C	Color (Chrominance)

Serial and / or Touch Screen Control

Pin	Name	Description
1	NC	No Connection
2	RXD	Touch Screen Data Receive
3	TXD	Flash Upgrade & Touch Screen Transmit
4	NC	No Connection
5	GND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	RXD	Flash Upgrade Receive Data

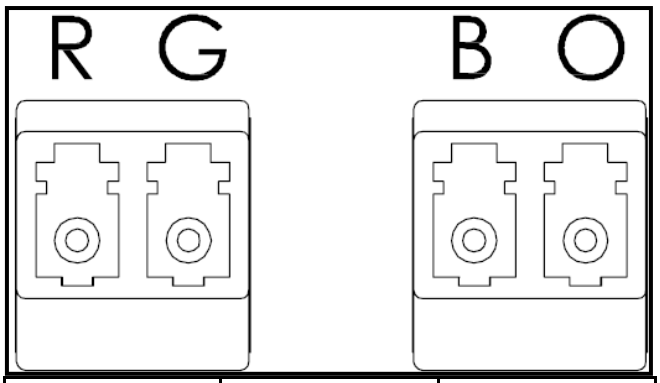
Note: The following cables are available from NDS.
Flash Upgrade Cable order part number: 35Z0009



DVI-D*
Digital Input

PIN#	SIGNAL	PIN#	SIGNAL
1	T.M.D.S. DATA 2-	16	HOT PLUG DETECT
2	T.M.D.S. DATA 2+	17	T.M.D.S. DATA 0-
3	T.M.D.S. DATA 2/4 SHIELD	18	T.M.D.S. DATA 0+
4	T.M.D.S. DATA 4-	19	T.M.D.S. DATA 0/5 SHIELD
5	T.M.D.S. DATA 4+	20	T.M.D.S. DATA 5-
6	DDC CLOCK	21	T.M.D.S. DATA 5+
7	DDC DATA	22	T.M.D.S. CLOCK SHIELD
8	N/C	23	T.M.D.S. CLOCK+
9	T.M.D.S. DATA 1-	24	T.M.D.S. CLOCK-
10	T.M.D.S. DATA 1+		
11	T.M.D.S. DATA 1/3 SHIELD	C1	N/C
12	T.M.D.S. DATA 3-	C2	N/C
13	T.M.D.S. DATA 3+	C3	N/C
14	+5V POWER	C4	N/C
15	GND	C5	N/C

* Compliant with DVI 1.0



Pin	Name	Description
R	Red	Red Signal
G	Green	Green Signal
B	Blue	Blue Signal
O	Clock	Clock & Sync

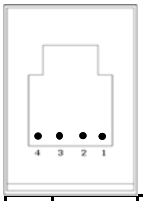
GPIO Connectors and Pin Outs

General Purpose Input and Output (GPIO)

Swap
Pressing the Swap button swaps the position and size of the Primary and Secondary images.

PIP Size
The size of Secondary image increases each time the PIP Size button is pressed. See page 6 for details.

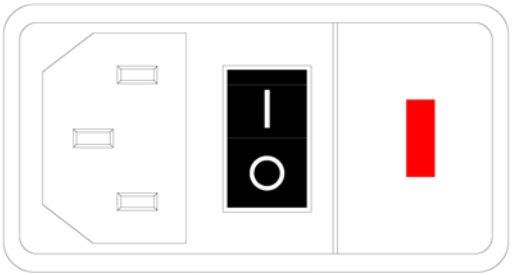
Record Indicator
The Record Indicator is displayed while a contact closure to the ground pin is present, the indicator is removed when the contacts are opened. The Record Indicator, shown below, is displayed in the monitor's top left corner.



GPIO
Mating connector:
RJH 4 pin
Telephone Handset
Connector

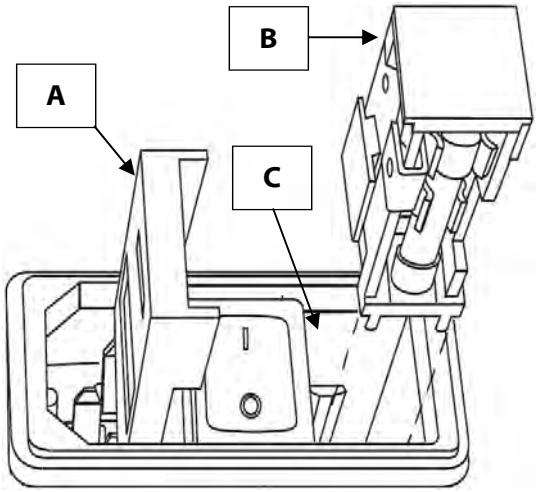
Pin	Name	Description
1	Swap	Swap Pri & Sec inputs
2	P.S.	PIP Size.
3	R.I.	Record Indicator.
4	GND	Common Ground

Power Connector and Pin Out



Pin	Name	Description
Top	Line	AC Source
Mid	Gnd	Ground
Bottom	Neutral	AC return

Power Connector Fuse Replacement



Fuse Replacement:
1. Using a small screwdriver, gently pry open the door (A) that covers the fuse carrier (B).
2. Use the screwdriver to pry the fuse carrier (B) out of its well (C.).
3. Identify and remove the failed fuse.
4. When installing a new fuse*, make sure that one end of the fuse touches the back of the carrier as shown in (B).

*** Fuse information:**
Cooper Bussmann, S506-5A, 5A, 250V, time delay

Specifications[1]

Part Number	90R0017	90R0011	90R0027	90R0016
Viewable Diagonal (inches)	37.0	42.0	52.0	54.6
Brightness [2](cd/m², typical)	500	550	500	500
Native Resolution	1920 x 1080	1920 x 1080	1920 X 1080	1920 x 1080
Dot Pitch (mm)	.427	.485	.60	.63
Vertical Viewing Angle (degrees)	178	178	178	176
Horizontal Viewing Angle (degrees)	178	178	178	176
Contrast Ratio (nominal)	800:1	700:1	1000:1	550:1
Vertical Freq (Hz, max)	85	85	85	85
Bandwidth (MHz, max)	135	135	135	135
VGA Input signal level at 75Ohm	0.7 V p-p	0.7 V p-p	0.7 V p-p	0.7 V p-p
Pixel Clock (MHz, max)	170	170	170	170
HD-SDI / SDI Input signal level	.8 to 2.0 V p-p	.8 to 2.0 V p-p	.8 to 2.0 V p-p	.8 to 2.0 V p-p
S-Video Input signal level	0.7 V p-p	0.7 V p-p	0.7 V p-p	0.7 V p-p
Composite Input signal level	1 V p-p	1 V p-p	1 V p-p	1 V p-p
Sync On Green (SOG)	0.7 V p-p	0.7 V p-p	0.7 V p-p	0.7 V p-p
RGBS Input signal level	0.7 V p-p	0.7 V p-p	0.7 V p-p	0.7 V p-p
Sync	0.4 to 4.0 V p-p	0.4 to 4.0 V p-p	0.4 to 4.0 V p-p	0.4 to 4.0 V p-p
Pixel Clock (MHz, max) [3]	140	140	140	140
Power Consumption (nominal)	185w	200w	360w	360w
Display Weight (lbs, (kg))	47 (21)	66 (30)	93 (42)	116 (53)
Environmental				
Operating Temperature	0 to 40^{0}C	0 to 40^{0}C	0 to 40^{0}C	0 to 40^{0}C
Storage Temperature	-20 to 50^{0}C	-20 to 50^{0}C	-20 to 50^{0}C	-20 to 50^{0}C
Relative Humidity (non condensing)	10-90%	10-90%	10-90%	10-90%

Notes:
1. Specifications are subject to change without notice. Contact factory for recent specifications.
2. Brightness shown is without a Touch Screen or A/R filter installed.
3. Applies to RGBS and Sync On Green (SOG).

Video Inputs	**Connector Type**
SDI	BNC, 75 Ohm terminated
S-video	BNC x 2 (Y & C), 75 Ohm terminated
S-video	DIN-4
RGBS / YPbPr	BNC x 5, 75 Ohm terminated
RGBS / YPbPr	HD-15
Composite	BNC, 75 Ohm terminated
Sync-On-Green (SOG)	BNC, 75 Ohm terminated
Graphics Inputs	
DVI	DVI-D
VGA	HD-15
Outputs	
SDI	BNC
S-Video	DIN-4
RGBS / YPbPr	BNC x 5
RGBS / YPbPr	HD-15
Composite / SOG	BNC

Video Formats	**Horiz. Freq** (kHz)	**Interlaced / Progressive**	**Aspect Ratio**	**Standard Digital/Analog**
Serial Digital and Analog				
576/50i (PAL) SDI, Comp, S-video, RGBS, YPbPr	15.625	Interlaced	4:3	SMPTE 259M, C ITU 601
480/60i (NTSC) SDI, Comp, S-video, RGBS, YPbPr	15.734	Interlaced	4:3	SMPTE 259M, C ITU 601
576/50p RGBS, YPbPr, SOG, DVI	31.250	Progressive	4:3	ITU-R-BT1358
480/60p RGBS, YPbPr, SOG, DVI	31.469	Progressive	4:3	SMPTE 293M
720/50p RGBS, YPbPr, DVI, HD-SDI	37.500	Progressive	16:9	SMPTE 292M, SMPTE 296M
720/60p RGBS, YPbPr, DVI, HD-SDI	45.000	Progressive	16:9	SMPTE 292M, SMPTE 296M
1080/50i RGBS, YPbPr, DVI, HD-SDI	28.125	Interlaced	16:9	SMPTE 292M, SMPTE 274M
1080/60i RGBS, YPbPr, DVI, HD-SDI	33.750	Interlaced	16:9	SMPTE 292M, SMPTE 274M
1080/50p DVI	56.200	Progressive	16:9	SMPTE 274M
1080/60p DVI	67.300	Progressive	16:9	SMPTE 274M

Cleaning Instructions:

Follow your hospital protocol for the handling of blood and body fluids. Clean the display with a diluted mixture of mild detergent and water. Use a soft towel or swab. Use of certain cleaning agents may cause degradation to the labels and plastic components of the product. Consult cleanser manufacturer to see if agent is compatible with it. Do not allow liquid to enter the display.

NDS
SURGICAL · IMAGING

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60G0127

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