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ROSEN
AVIATION

15" SlimLine II Display



Technical Manual

Model 1500-003 series

Model 1500-084 series

Technical Manual, 15" SlimLine II Display**© 2009 by Rosen Aviation, LLC**

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1. INTRODUCTION AND DISPLAY OVERVIEW

This manual describes how to install the Rosen 15" SlimLine II bulkhead and center-mount arm displays onto your aircraft. It contains everything you need to know to wire the display and confirm that it is functioning correctly.

Note: Only trained and qualified personnel should perform installation and service.

1.1. Unpacking

Parts shipped with the 15" SlimLine Display:

- Outline & Installation Drawing
- 15" SlimLine Display
- Bulkhead Main Interface Connector Kit (P/N **0300-021**)

The center-mount arm RNVAP base receptacle (P/N **0100-020**) is sold separately.

Optional controller sold separately:

- External 7-button Controller (P/N **0300-402**) shipped with *Remote Controller Technical Information* (P/N **100434**).
- Universal Color Remote (P/N **0500-015**)



For help with *Outline & Installation* drawings, please contact Rosen Aviation Customer Service at (541) 342-3802.

2. INSTALLATION GUIDELINES

There are several ways to connect the 15" SlimLine II Display to an aircraft's entertainment system.

Use the pinout descriptions on page 2 of the *Outline & Installation* drawing to assist in the wiring process. Pay close attention to the pinout information while completing wiring connections.

Note: This display is for entertainment purposes only; connect to the non-critical power bus.

Once you access the home page, click on **Products→Displays→15 In SlimLine**. Select a drawing by model number from the drop-down menu in the middle of the page.

Drawings are provided to assist in the installation process. Pay close attention to dimensions and rotations when considering installation requirements.



Touching the LCD with excessive force may leave pressure spots that show in video display. Handle with care.

2.1. Monitor Diagrams

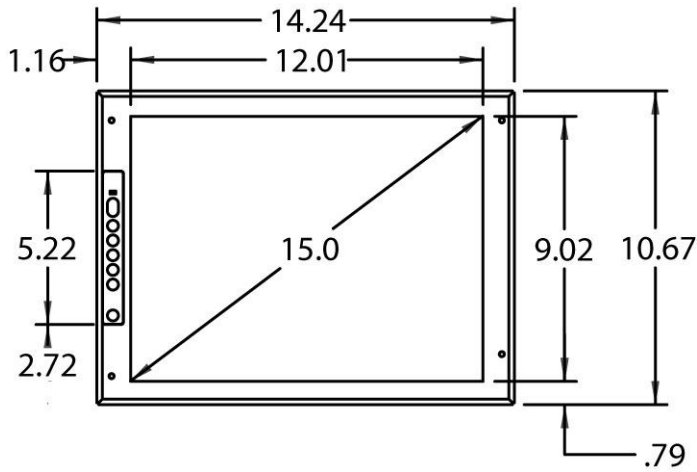


Figure 1 1500 Bulkhead outline dimensions (inches)

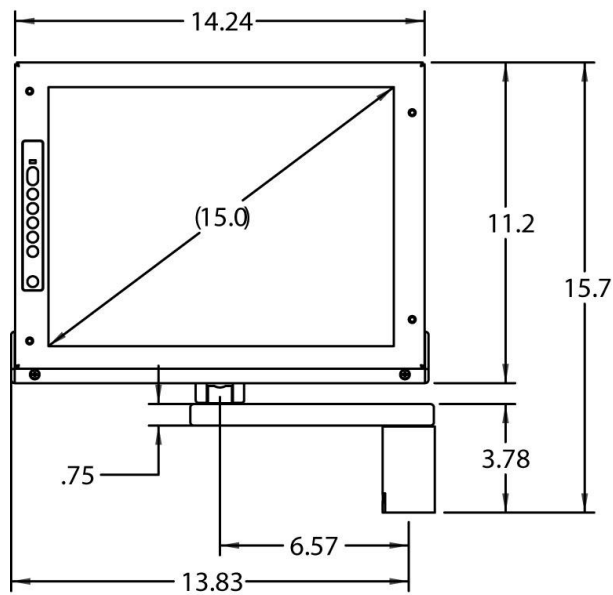


Figure 2 1500 Center-mount Arm outline dimensions (inches)

2.2. Cooling and Ventilation

The display is cooled by the flow of air, or natural convection. Special care must be taken with the installation to provide a proper environment for air flow.

- **Monitor vents:** The unit is designed with vent openings on the top, bottom, and rear surfaces. The entire top vent, and either the entire bottom or entire rear vent must be unobstructed for a minimum of one (1) inch. The vents must also be ducted to free air.
- **Ducting:** The installation must provide for an inlet duct (at bottom or rear), and an exhaust duct at the top. Each of these ducts must have a minimum of four (4) square inches of cross-sectional area.

Note: Display backlight will shut down if internal temperature reaches 140° F.

Note: Each mounting hole includes a 10-32 screw. To install the display, remove only the screws that will be used to install the display. Do not remove the 4-40 flathead screws.

2.3. Bulkhead Mounting Options

The bulkhead display can be mounted using all mounting holes on rear surface or from any combination of two sides.

(Dimensions in inches)

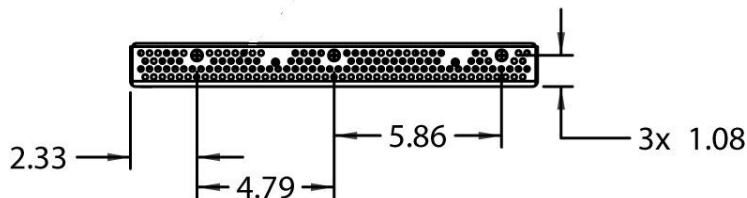


Figure 2 Top view with mounting holes

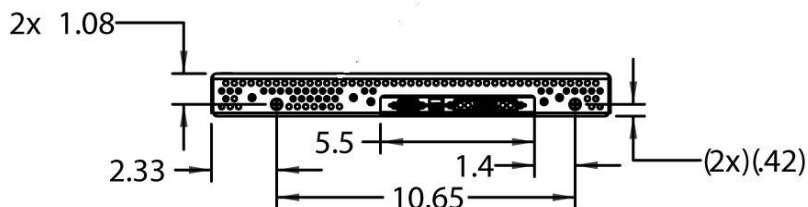
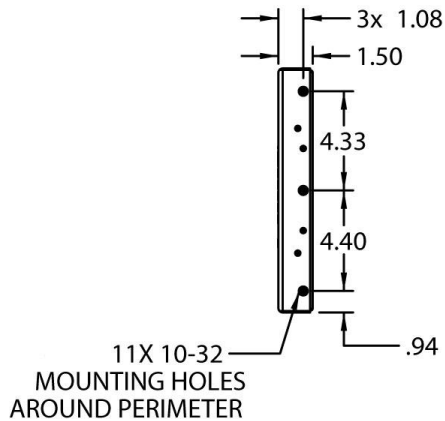


Figure 3 Bottom view with mounting holes



Warning! !	Maximum screw penetration depth:
	Top .75 inches
	Bottom .75 inches
	Sides .75 inches
	Rear .75 inches

Figure 4 Side view with mounting holes

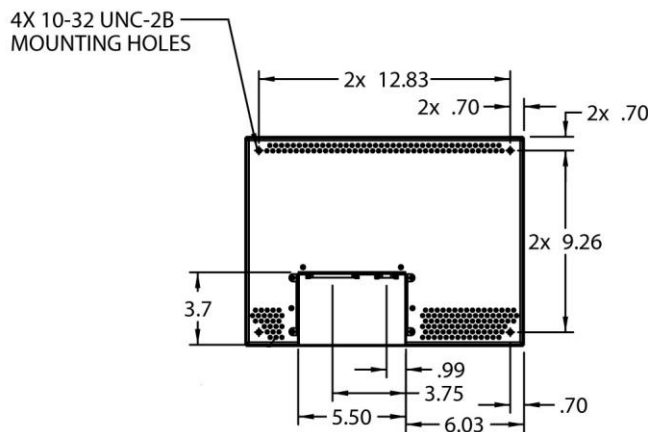


Figure 5 Rear view with mounting holes

3. VIDEO CONNECTIONS

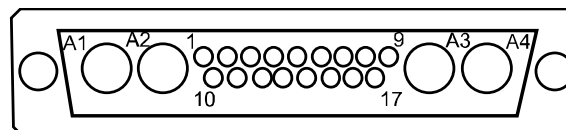
3.1. Bulkhead Main Interface Connector

The main input connector on this display is a 21WA4 Male Combo D-subminiature with 17 size-20 contacts (standard density D-sub) and four size-8 coaxial contacts, mounting in a size-4 D-subminiature shell.

Recommended mating connector: ITT Cannon (P/N **9000879**).

Note: Backshell of main connector is Positronic D37000GEO-1023.5.

Warning! Do not plug or unplug display while power is applied!



Rear view of the Bulkhead Main Interface Connector

3.1.1. Bulkhead Main Connector Functions

Pin #	Signal	Input/Output	Description
1	28V return	Input	Aircraft power supply
2	28V	Output	Aircraft power supply
3	IR +5V	Output	Power for optional IR receiver
4	IR signal	Input	IR receiver signal input
5	Reserved	Reserved	Reserved
6	RGB/video select switch	Input	TTL level input. Used to select RGB or Composite Video
7	Status output	Output	TTL level output indicates monitor is powered on when logic High (Max. current draw is 10 milliamps)
8	HSync	Input	RGB graphics input, TTL level
9	VSync	Input	RGB graphics input, TTL level
10	28V return,	Input	Aircraft power supply
11	+28V	Output	Aircraft power supply
12	IR GND	Output	Ground for IR receiver
13	Computer sync GND	Input	Reference ground for RGB sync
14	Reserved	Reserved	Reserved
15, 16, 17	Digital GND	Input	Common digital ground connection, connected to computer sync GND
A1 signal	Red	Input	Red graphics input, 1Vp-p, 75 ohm
A1 shield	Red Return	Input	Red graphics input, 1Vp-p, 75 ohm
A2 signal	Green	Input	Green graphics input, 1Vp-p, 75 ohm
A2 shield	Green Return	Input	Green graphics input, 1Vp-p, 75 ohm
A3 signal	Blue	Input	Blue graphics input, 1Vp-p, 75 ohm
A3 shield	Blue Return	Input	Blue graphics input, 1Vp-p, 75 ohm
A4 signal	Composite Video	Input	Composite video input, 1Vp-p, 75 ohm
A4 shield	Composite Video Return	Input	Composite video input, 1Vp-p, 75 ohm

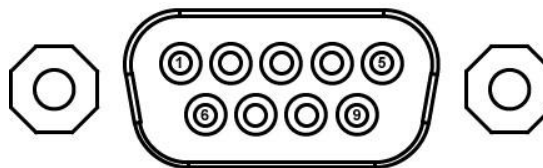
3.1.2. Center-mount Arm Connector Functions

Pin #	Signal	Input/Output	Description
1	Red	Input	Red graphics input, 1Vp-p, 75 ohm
2	Green	Input	Green graphics input, 1Vp-p, 75 ohm
3	Blue	Input	Blue graphics input, 1Vp-p, 75 ohm
4	Reserved	Reserved	Reserved
5	Reserved	Reserved	Reserved
6	Red Return	Input	Red graphics input, 1Vp-p, 75 ohm
7	Green Return	Input	Green graphics input, 1Vp-p, 75 ohm
8	Blue Return	Input	Blue graphics input, 1Vp-p, 75 ohm
9	Reserved	Reserved	Reserved
10	Computer sync GND	Input	Reference ground for RGB sync
11, 12	Reserved	Reserved	Reserved
13	HSync	Input	RGB graphics input, TTL level
14	VSync	Input	RGB graphics input, TTL level
15	RGB/video select switch	Input	TTL level input. Used to select RGB or Composite Video
16	Reserved	Reserved	Reserved
17	+28V	Input	Aircraft power supply
18	28V return	Input	Aircraft power supply
19	Status output	Output	TTL level output indicates monitor is powered on when logic High (Max. current draw is 10 milliamps)
20	Composite Video return	Input	Composite video input, 1Vp-p, 75 ohm
21, 22, 23	Reserved	Reserved	Reserved
24	Composite Video signal	Input	Composite video input, 1Vp-p, 75 ohm
25	+28V	Input	Aircraft power supply
26	28V return	Input	Aircraft power supply

3.2. Bulkhead External Control (0300-022)

The external VIP control interface is a 9-pin standard density D-subminiature male connector for the 7-button controller (P/N **0300-402**). Each function can be activated by a momentary connection to ground.

Pin #	Signal
1	Power On/Off
2	Source Select
3	Reserved
4	Up
5	Down
6	Menu Select
7	Left
8	Right
9	Ground



Rear view of the External Control Connector

3.3. DIP Switch Option Selection

Use DIP switches located near the input connectors. See Section [3.3.1](#) for detailed descriptions. Operation is as follows:

SW1	SW2	SW3	SW4	Function
On	Off	-	-	Constant ground switching
Off	On	-	-	Momentary ground switching
Off	Off	-	-	Manual mode
On	On			Auto-detect
-	-	Off	-	Display defaults to Off (Auto Off)
-	-	On	-	Display defaults to On (Auto On)
-	-	-	On	Front switch panel enabled
-	-	-	Off	Front switch panel disabled

The display may be configured to several options through the setting of DIP switches located near the input connectors. The DIP switch settings are detected when 28 volts are applied and each time the power button is pressed to turn on the display.

3.3.1. DIP Switch Function Descriptions

Auto-Detect

This mode will automatically switch to the RGB input whenever an RGB signal is connected to the monitor by detecting the presence of the HSync signal (pin 8 of the 21WA4 combo connector). If no RGB signal is detected, it will automatically switch to the Composite Video input, whether a video signal is present or not. The Source button located on the front panel membrane switch and optional external switch controller will be locked out.

Constant Ground

This mode uses a SPST (single pole single throw) external rocker switch connected between ground and RGB/Video Select.

- Bulkhead – Pin 6 of the 21WA4 combo connector
- Center-mount Arm – Pin 15 of the 26-pin D-Sub connector

When the RGB/Video Select pin is connected to ground, the monitor will switch to the RGB input, whether an RGB signal is present or not. When the RGB/Video Select pin is not connected to ground, the monitor will switch to the Composite Video input, whether a video signal is present or not. The Source button located on the front panel membrane switch and optional external switch controller will be locked out.

Momentary Ground

This mode uses a SPST external momentary switch between ground and the RGB/Video Select.

- Bulkhead – Pin 6 of the 21WA4 combo connector
- Center-mount Arm – Pin 15 of the 26-pin D-Sub connector

Each time the switch is pressed, the monitor will switch back and forth between the RGB and Composite Video inputs, whether a signal is present or not. The Source button located on the front panel membrane switch and optional external switch controller can also be used to switch between the RGB and Composite Video inputs.

Manual Mode

This mode will not switch between RGB and Composite Video through the Auto-Detect, Constant Ground, or Momentary Ground options. The Source button located on the front panel membrane switch and optional external switch controller can be used to switch between the RGB and Composite Video inputs.

Automatic Power-Up

SW3 On: The monitor will come on as soon as 28 volts power is applied.

SW3 Off: The monitor stays off when 28 volts power is applied. The power button on the front panel membrane switch or the optional external switch controller must be pressed to turn on the monitor.

Membrane Switch Enable

SW4 On: Front panel membrane switch is enabled.

SW4 Off: Front panel membrane switch is disabled.

4. OPERATION

4.1. Front Switch Panel Features

To operate the 15" SlimLine II Display, use the front switch panel buttons shown below. (External controller or IR remote control options are available separately.)

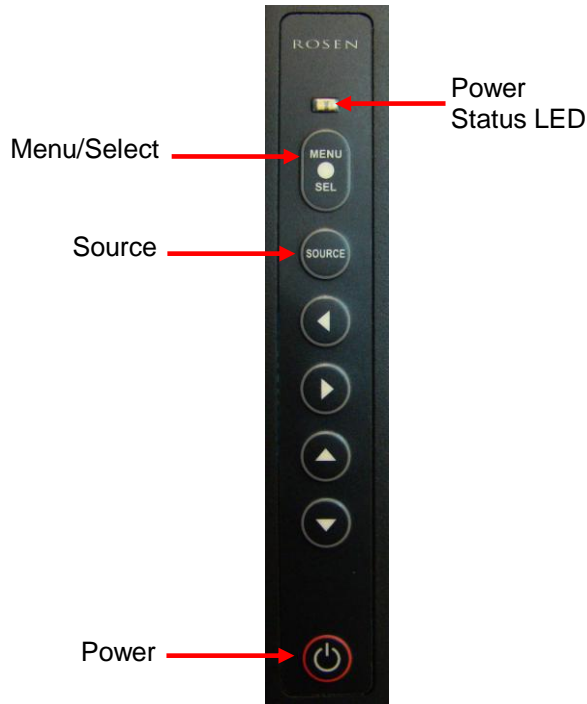


Figure 6 Front switch panel buttons

Front Switch Panel Features

Feature	How it Works
Power Status LED	When the LED is green, the display is on. When the LED is red, the display is in Standby Mode.
Menu/Sel	Press to view the OSD Main Menu and to select the highlighted Main Menu option.
Source	Press to toggle the video source between analog RGB and Composite video. Note: This only functions when DIP switch is set to Momentary Ground or Manual Mode.
▼▲▶◀	Press to select a menu option or to increase or decrease a value.
Power	Press to power the display on or off.

4.2. On-Screen Display (OSD) Main Menu

The On-Screen Display (OSD) provides a set of menus that enable you to adjust or view the display's features. Main Menu selections lead to submenus with additional choices. Press the **Menu Select** button on the front switch panel to open the Main Menu.



Figure 3 Main Menu for analog RGB mode (left) and for composite mode (right)

To switch to different Main Menus (OSD, Utility, and Auto), press the ◀ ▶ buttons on the front switch panel.

To highlight a submenu, press the ▼ button on the front switch panel. When submenus are highlighted, press the ◀ ▶ buttons to adjust up or down.

To return to the Main Menu, press the ▶ button on the front switch panel to highlight **Return** in the submenu.

To exit the Main Menu, press ▶ button until **Exit** is highlighted and then press the **Menu Select** button.

Note: It takes five seconds for changes to be stored into memory.

4.3. Picture Submenu

Menu Option	How it Works
Brightness	Adjusts picture brightness
Contrast	Adjusts picture contrast
Hue	Shifts the color balance or tint
Saturation	Intensifies the image colors
Filter Select	Increases the clarity of the picture
Phase	Removes noise in RGB mode
Frequency	Adjusts the picture size in RGB mode
H Position	Adjusts horizontal position
V Position	Adjusts vertical position
Sharpness	Adjusts picture sharpness
Return	Returns OSD to the Main Menu

These options available only in Composite mode

These options available only in RGB mode

4.4. OSD Submenu

Menu Option	How it Works
H Position	Adjusts OSD horizontal position
V Position	Adjusts OSD vertical position
OSD Timeout	Adjusts time in which OSD turns off if left alone
Return	Returns OSD to the Main Menu

4.5. Utility Submenu

Menu Option	How it Works
Freeze Frame	Freezes picture frame
Reset	Returns options to default settings
Special Filter	Slow/fast motion picture filter
Color Temperature	Opens Color Adjustment submenu, where you can adjust red, green, and blue values
Information	Provides monitor info
Return	Returns OSD to the Main Menu

4.6. Auto Submenu

Menu Option	How it Works
Auto	Automatically adjusts image size in RGB mode

4.7. Exit Submenu

Menu Option	How it Works
Exit	Closes the screen. To exit menu, press ◀.

5. HOT KEYS

Hot keys are a quick way of adjusting brightness, contrast, and the scaling modes. To activate the hot keys, press the ▲▼ buttons on the front panel to cycle through these modes, and then use the ►◀ buttons to change values. The hot keys will not work if an OSD menu is open.

Scaling mode: The scaling mode will adjust the picture depending on the type of formatted DVD disc you are using.

Note: If the picture looks stretched, adjust the scaling mode.

6. TECHNICAL REFERENCES AND SUPPORT

If the display does not function properly, refer to the following troubleshooting table for symptoms and possible solutions before contacting Rosen field support.

- Always use an oscilloscope to verify the video signal
- Always use a multimeter to verify voltages
- Check actual results against the requirements described in this manual

Problem	Possible Solutions
No video	<ul style="list-style-type: none"> ● Verify that the video source is on and has a tape or DVD installed. ● Verify that a signal is reaching the display by using an oscilloscope or another display. ● Verify that the display is turned on (LED is green). ● Verify that the pinout is correct. ● Verify that the video input (Analog RGB/Composite) and video standard (NTSC/PAL/SECAM/RS-170) match your application.
Screen is black	<ul style="list-style-type: none"> ● Verify that the display is receiving power. ● Verify that the pinout is correct. ● Verify that the video source is on and has a tape or DVD installed. ● Verify all connections.
Screen is blue	<ul style="list-style-type: none"> ● Verify that a signal is reaching the display by using an oscilloscope or another display. ● Verify that the pinout is correct. ● Verify that the video source is on and has a tape or DVD installed.
Color is out of adjustment	<ul style="list-style-type: none"> ● Refer to the On-Screen Display (OSD) Main Menu options described on page 13.
Image flickers	<ul style="list-style-type: none"> ● Verify that the signal cable is secure. ● Verify that the vertical frame frequency is 75 Hz or less. If using the display with a PC in Windows, go to Control Panel→Display→Settings→Advanced→Monitor and change the screen refresh rate to 60 Hz to achieve the best performance.
Image is distorted	<ul style="list-style-type: none"> ● Verify pinouts. ● Verify that a signal is reaching the display by using an oscilloscope or another display. ● Examine the display for pinched or damaged cables.
No Backlight	<ul style="list-style-type: none"> ● The display backlight will shut down if the internal temperature reaches 140° F. Normal operation will resume after the temperature returns to an acceptable operating temperature.

Cleaning the Display

Clean the LCD with a lens-grade tissue for cleaning optical surfaces and isopropyl alcohol.

7. DO-160D QUALIFICATIONS

DO-160D test criteria to which we test the 1500 series displays

Description	DO-160D Section	DO-160D Category
Temperature and Altitude	4.0	A1
Temperature Variation	5.0	C
Humidity	6.0	A
Operational Shock & Crash Safety	7.0	B
Vibration	8.0	SB
Explosion Proofness	9.0	N/A
Waterproofness	10.0	N/A
Fluids Susceptibility	11.0	N/A
Sand & Dust	12.0	N/A
Fungus Resistance	13.0	N/A
Salt Spray	14.0	N/A
Magnetic Effect	15.0	Z
Power Input	16.0	AB
Voltage Spike	17.0	B
Audio Frequency Susceptibility — Power Inputs	18.0	Z
Induced Signal Susceptibility	19.0	Z
Radio Frequency Susceptibility (Radiated & Conducted)	20.0	TT
Emission of Radio Frequency Energy	21.0	B
Lightning Induced Transient Susceptibility	22.0	N/A
Lightning Direct Effects	23.0	N/A
Icing	24.0	N/A
Electrostatic Discharge	25.0	A

7.1. Bulkhead Specifications

Size	12.17 x 9.18 inches [309.12 x 233.17 mm]
Resolution	1024 w x 768 h (XGA)
Viewing Angle (H/V)	±80/80°
Brightness	200 cd/m ² min., 250 typical
Contrast Ratio	400:1 typical
Backlight Lamp Life	50,000 hours
Weight	6.14 lbs [2.76 kg] ± 5%
Dimensions	14.24" (W) x 10.67" (H) x 1.50" (D) [361.70 mm (W) x 271.02 mm (H) x 38.1 mm (D)]
Power Requirements	28VDC 35W maximum
Video Performance	
Video Standards	NTSC, PAL, SECAM, RS170
Graphics Standards	VGA SVGA, XGA (75 Hz max)
Video Input	1Vp-p, 75 ohms
Operating Temperature	0°C - 50°C
Warranty	2-year

7.2. Center-mount Arm Specifications

Size	12.17 x 9.18 inches [309.12 x 233.17 mm]
Resolution	1024 w x 768 h (XGA)
Viewing Angle (H/V)	±80/80°
Brightness	200 cd/m ² min., 250 typical
Contrast Ratio	400:1 typical
Backlight Lamp Life	50,000 hours
Weight	8.65 lbs [3.92 kg] ± 5%
Dimensions	14.24" (W) x 15.7" (H) x 1.50" (D) [361.70 mm (W) x 398.78 mm (H) x 38.1 mm (D)]
Power Requirements	28VDC/ 1.1A
Video Performance	
Video Standards	NTSC, PAL, SECAM, RS170 (B&W)
Graphics Standards	VGA through XGA
Video Input	1Vp-p, 75 ohms
Operating Temperature	0°C - 50°C
Warranty	2-year

8. REVISION HISTORY

Revision	Date	Revision Description	EC #
D	01/06/09	Update format, add OSD changes to match firmware	08560