
RM-4290W Series

- RM-4290W-HD
- RM-4290W-2HD

4RU, 2-Screen, 9" Audio/Video Monitors

User Guide

Part Number 821714, Revision D



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This document is intended to be printed on a duplex printer, such that the copy appears on both sides of each page. This ensures that all new chapters start on a right-facing page.

This document looks best when printed on a color printer since some images may be indistinct when printed on a black and white printer.

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RM-4290W Series User Guide

Introduction

Overview

The 4RU, rack-mounted RM-4290W-HD Series set a new standard in LCD monitors for broadcast and professional video applications. They have anti-glare TFT screens, and support full digital signal HD/SD-SDI processing video standards. All video formats are scaled to fit on screen in the highest quality using full, digital processing, precision scaling and gamma correction to produce the best images available.

Topics

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Safety Instructions

1. Read, keep, and follow all of these instructions; heed all warnings.
2. Do not use this equipment near water.
3. Use only a dry cloth to clean the equipment.
4. Do not block any ventilation openings. Install only in accordance with the instructions in the section entitled, “[Installation Recommendations](#)” on [page 6](#).
5. Do not install near any heat source such as a radiator, heat register, amplifier, or stove.
6. Do not expose the equipment to rain or moisture.
7. Do not attempt to plug the unit into a two-blade outlet (with only two prongs of equal width).

IMPORTANT: By design, these monitors will only plug into a three-prong outlet for your safety. If the plug does not fit into your outlet, contact an electrician to replace the obsolete outlet.

8. Protect the power cord from being walked on or pinched, particularly at plug's source on the equipment and at the socket.
9. Use only the attachments/accessories specified by the manufacturer.
10. Unplug the equipment during lightning storms or when unused for long periods of time.
11. Refer all servicing to qualified service personnel. Servicing will be required under all of the following conditions:
 - The equipment has been damaged in any way, such as when the power-supply cord or plug is damaged.
 - Liquid had been spilled or objects have fallen onto the equipment.
 - The equipment has been exposed to rain or moisture.
 - The equipment does not operate normally.
 - The equipment has been dropped.

Installation Recommendations

Mounting

The unit is designed to install into a standard 19" rack. The unit should be mounted at approximately ear level for optimum frequency response and at eye level for optimum visual observation.

Heat Dissipation

No special physical mounting considerations are necessary regarding heat dissipation except under adverse conditions, provided the ambient temperature inside the mounting enclosure does not exceed 40°C (104°F). Adjacent devices can be rack mounted (or stacked) in proximity to the unit. If the temperature is above 40°C, allow a 1RU (1.75"/44.45mm) space above and below the unit for air circulation.

DC Power

Connect the unit to its external 100 to 240VAC (50 to 60Hz) to 12VDC power supply (included).

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Features

Common Features

These audio/video monitors are designed for confidence monitoring of HD/SD-SDI and composite video broadcast signal (CVBS) video sources. Input signals are automatically detected and accommodated. Up to eight of the sixteen audio channels embedded in an HD/SD-SDI bit stream may be selected for visual monitoring on eight on-screen bar graph style level meters. Left and right speakers and headphone jack allow audible stereo monitoring of the left/right channels.

Each of the two high-resolution LCD screens display high definition or standard definition video at either 4:3 or 16:9 aspect ratio. Parameters are selected and adjusted using an On Screen Display (OSD) MENU. Three function buttons may be programmed as hot keys for quick parameter settings. A DB9 connector serves as the interface to the two tally lights on the front panel.

Additional overlays can be added by the operator for Safe Area and Safe title markers, center mark, time code, and display name (for 16:9 aspect only). Time code is derived from embedded HD/SD-SDI source.

The slim and light weight design provides two screens in a very compact rack-size while the chassis only has 2.25 inches of depth.

These feature-rich audio/video monitors provide all of the following:

- Two LCDs are 9" diagonal
- Selectable 16:9 or 4:3 screen aspects for on screen video
- Rack mount mechanical design with vertical tilt
- Monitoring of audio through left and right front panel speakers or headphones
- Visually monitor audio levels on meters assignable to any channel
- Level meters can display VU, PPM (PK) or both with assignable -22db to -18db level
- Audio demux and display for up to eight channels from the sixteen embedded in the HD/SDI-SDI source

- Local control (via menu operation) for all functions including:
 - Blue gun as mono
 - Safe area
 - Safe title
 - Center markers
 - H/V delay
 - Monochrome display mode
 - Over/underscan
 - Display of input format
 - Display of input time code and up to 10 characters of user-defined text
 - Time code and text position in top or bottom of screen
 - Red/green/yellow/white text color
 - Built in color bars 75% full field
 - User defined configuration
 - Auto sets at power up
 - Waveform/Vectorscope monitor

- User defined hot key functionality provides all of the following:
 - H/V delay toggle through functions
 - Underscan toggle on/off
 - On Screen Display (OSD) on/off
 - Color bar on/off
 - Audio monitor display on/off
 - Area marker toggle

Product Distinctions

For a complete list of all the variations among these monitors, refer to [Table 1-1](#) below.

The RM-4290W-HD has two multi-rate inputs (one per screen) accepting composite (CVBS) or HD/SD-SDI video with re-clocked outputs of the HD/SD-SDI input on BNC connectors.

The RM-2490W-2HD, has four multi-rate inputs (two per screen) accepting composite (CVBS) or HD/SD-SDI video with no outputs. Each monitor also has a button on the front panel that toggles the two signal inputs to the screen.

Specifications

The specifications of all four models are listed below.

Table 1-1 Specifications

Specification	RM-4290W-HD Domain Range	RM-4290W-2HD Domain Range
Number of Screens	2	
Display	9" diagonal	
Aspect Ratios	16:9	
Viewing Angles (Tilt)	140°H x 100°V	
Screen Colors	262K	
Resolution (Dots, H x V)	800 x 480	
Dot Pitch (H x V, mm)	0.2475 x 0.2335	
Contrast Ratio	400:1	
Pixel Response (ms)	<25ms typical	
Dimensions (W x H x D)	19" x 7.75" x 4.65" (482.6 x 196.8 x 118.1 mm)	
Power Consumption	12VDC/10 watts (3.8 Amps max) CE & UL power supply	
Operating Temperature	0°C (32°F) to 40°C (104°F)	
Video Format	NTSC/PAL auto recognition	
HD/SD-SDI, Analog Composite Inputs	1 BNC per LCD Screen	2 BNCs per LCD Screen

Table 1–1 Specifications (Continued)

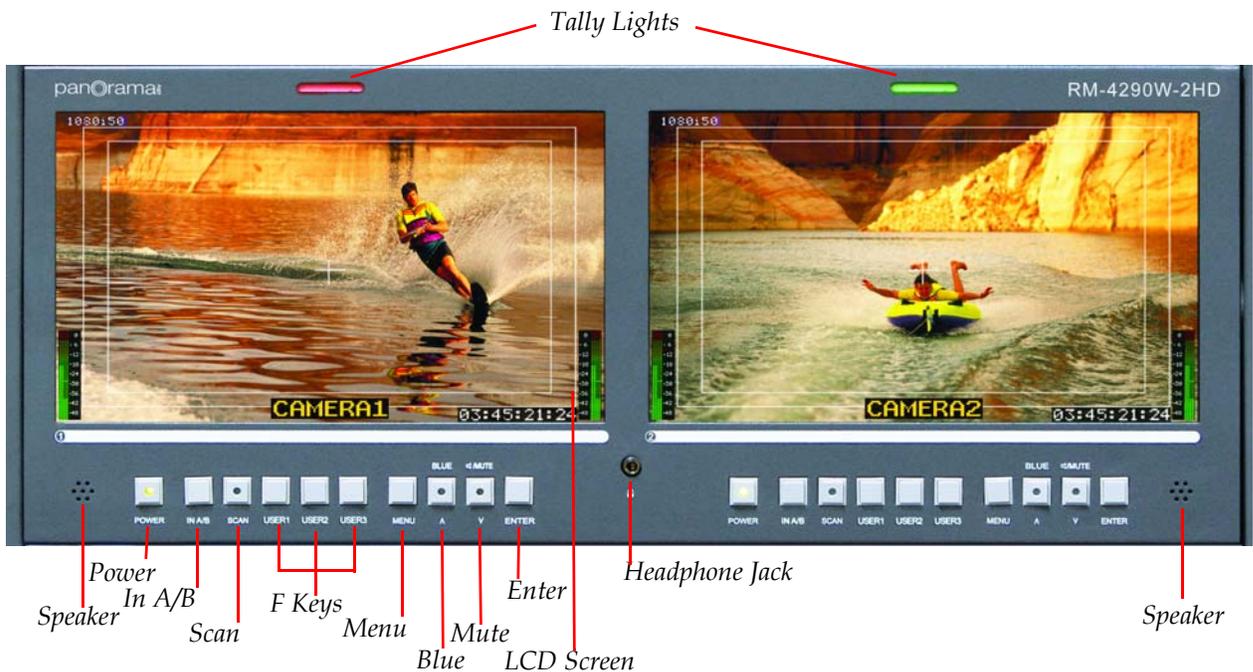
Specification	RM-4290W-HD Domain Range	RM-4290W-2HD Domain Range
HD/SD-SDI Re-clocked Outputs	1 BNC per LCD Screen	None
Space Required	4 rack units of an EIA-19 standard equipment rack	
Supplied Accessories	AC power adapter	

Note: All of the specifications listed in [Table 1-1](#) are subject to change without notice.

Front Panel Controls

The front panel feature descriptions refer to [Figure 1-1 on page 7](#).

Figure 1–1 RM-4290W-HD Front Panel



- **Tally Lights:** These tri-color (red/green/amber) lights are controlled through a DB9 connector on the rear panel. For more information about the DB9 connector, refer to [Rear Panel Connectors on page 9](#).

- **Speakers:** Audio may selected for monitoring through the left and right speakers.
- **Headphone Jack:** Monitor the assigned left/right stereo audio channels with stereo headphones from this mini-stereo connector. The speakers will mute when the headphones are plugged in.
- **Power:** Each of the four **Power** buttons turn the associated LCD screen on and off; the LED glows green to indicate on. When the indicator above the power switch is green then the unit is receiving power. When the indicator is flashing, the unit is in stand-by mode.
- **In A/B:** This button toggles the two inputs and displays the selected one to the screen.
 - Note:** The **In A/B** button is only available on the RM-4290W-2HD.
- **Aspect:** This button toggles the aspect ratio between 4:3 and 16:9 for the associated LCD screen when the input signal is SD-SDI. HD-SDI images are always 16:9 and will not be affected by the Aspect switch. The LED glows green to indicate 16:9.
 - Note:** The **Aspect** button is only available on the RM-4290W-HD.
- **Scan:** The **Scan** button toggles between the full video signal view (underscan mode) to a typical display visible on a customer's monitor (normal mode).
- **User1, 2, and 3:** The **User** buttons are programmable as hot keys for parameter adjustments. Refer to "[Programming the Hot Key Buttons](#)" on [page 18](#) for more information.
- **Menu:** Pressing the Menu button displays the OSD (On-Screen Display) menu. Refer to "[Using the OSD Menu](#)" on [page 12](#) for more information.
- **Blue** or \wedge : When the OSD Menu is not active, pressing this button toggles between three settings: blue monochromatic, grey scale monochromatic, and full color. When the OSD Menu is active, this button serves as the up (\wedge) navigation button in the menu.
- **Mute** or \vee : When the OSD Menu is not active, this button is used to select the audio source for monitoring through the headphones. Press this button on whichever LCD section you wish to audibly monitor, and the green LED will light to indicate your selection.

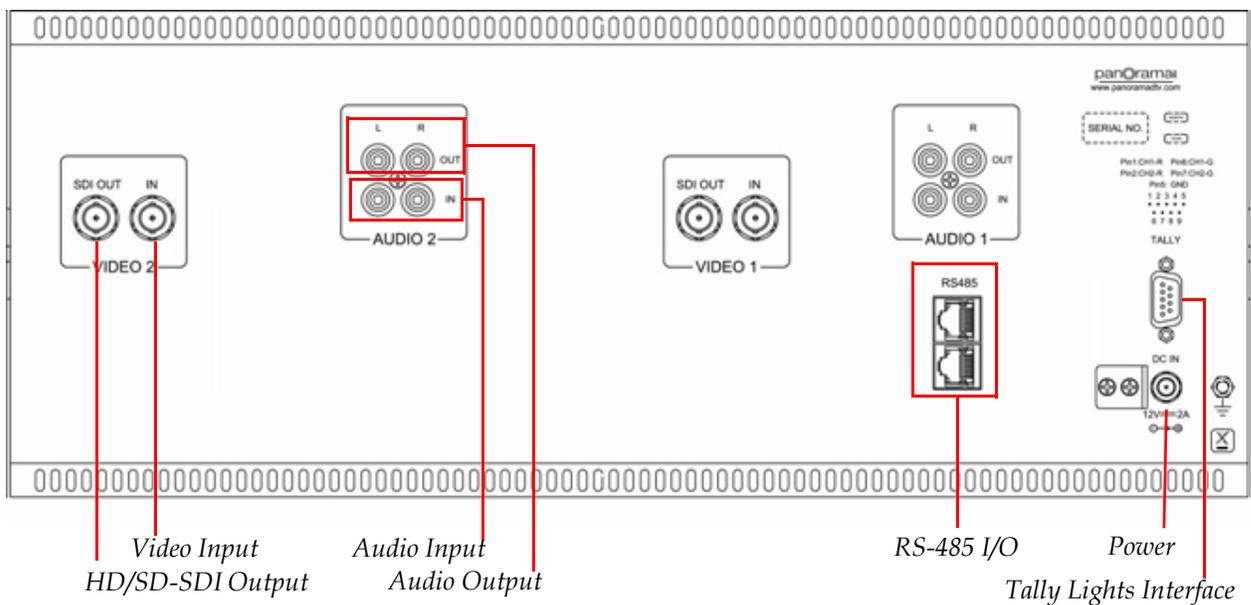
Pressing it a second time will mute the audio. Subsequent presses will toggle the mute off and on. The green LED flickers to indicate the mute is on. When the OSD Menu is active, this button serves as the down (v) navigation button in the menu.

- **Enter:** When the OSD menu is displayed, pressing this button enters items and accepts selections in the OSD Menu. Otherwise, it acts as a quick menu to select parameters for adjustment. Refer to “Programming the Hot Key Buttons” on page 18 for more information.
- **LCD Screen:** The LCD screens display the video and OSD features selected.

Rear Panel Connectors

The rear panel feature descriptions refer to [Figure 1-2](#) below.

Figure 1-2 RM-4290W-HD Rear Panel



- **Video Input Connector:** This auto-detecting, input connector accepts HD/SD-SDI or analog CVBS video signals. The inputs comply with SMPTE259M, SMPTE292M/ITU-R BT601. Composite video inputs comply with SMPTE-170M.

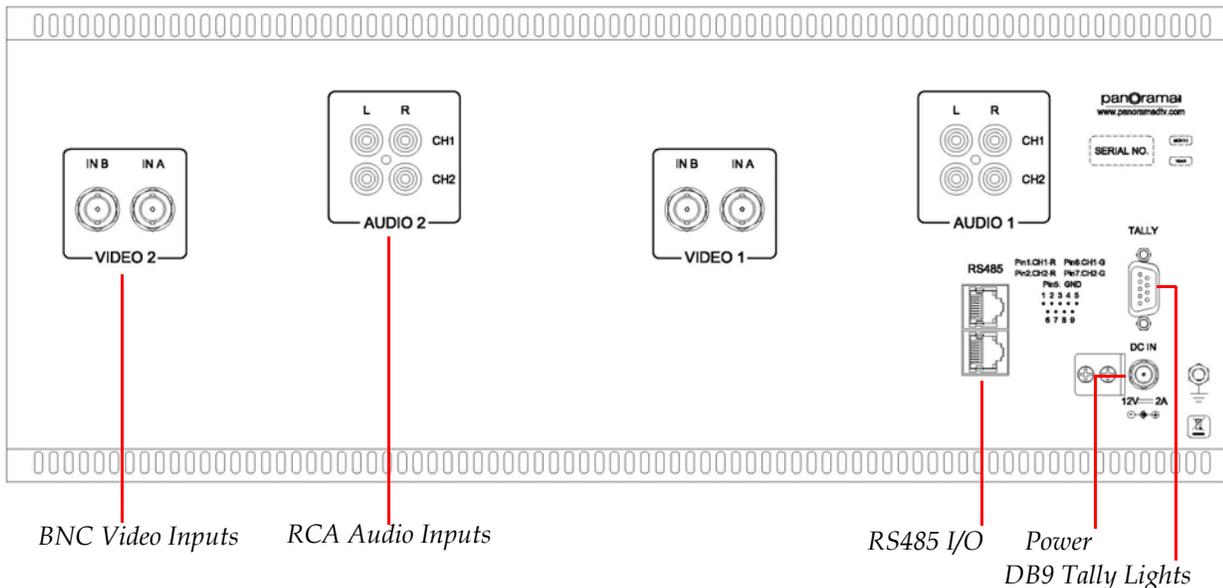
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- **HD/SD-SDI Output Connector:** The system re-shapes and re-clocks an HD/SD-SDI signal before outputting it to this female BNC connector.
- **Power Connector:** To provide power to the unit, attach the supplied 100 to 240VAC to 12VDC power supply to this connector.
- **Tally Interface Connector:** This DB9 connector controls the tally lights on the front panel. Refer to [Figure 1-3](#) below for the pin out.

Figure 1-3 Rear Panel DB-9 Connector Pin Out



Figure 1-4 RM-4290W-2HD Rear Panel



- **BNC Video Inputs:** Each screen has two inputs that are toggled to the display screen with **In A/B** button on the front panel.
- **RCA Audio Inputs:** Provides inputs for analog signals.

- **RS-485 I/O (on RJ-45):** These two ports are used for system software upgrades and dynamic IMD controls.

Figure 1–5 RS-485 I/O Pin Out

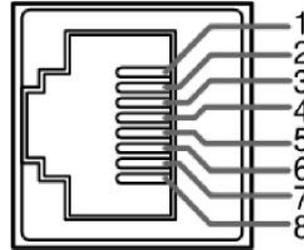


Table 1–2 RS-485 Pin Out

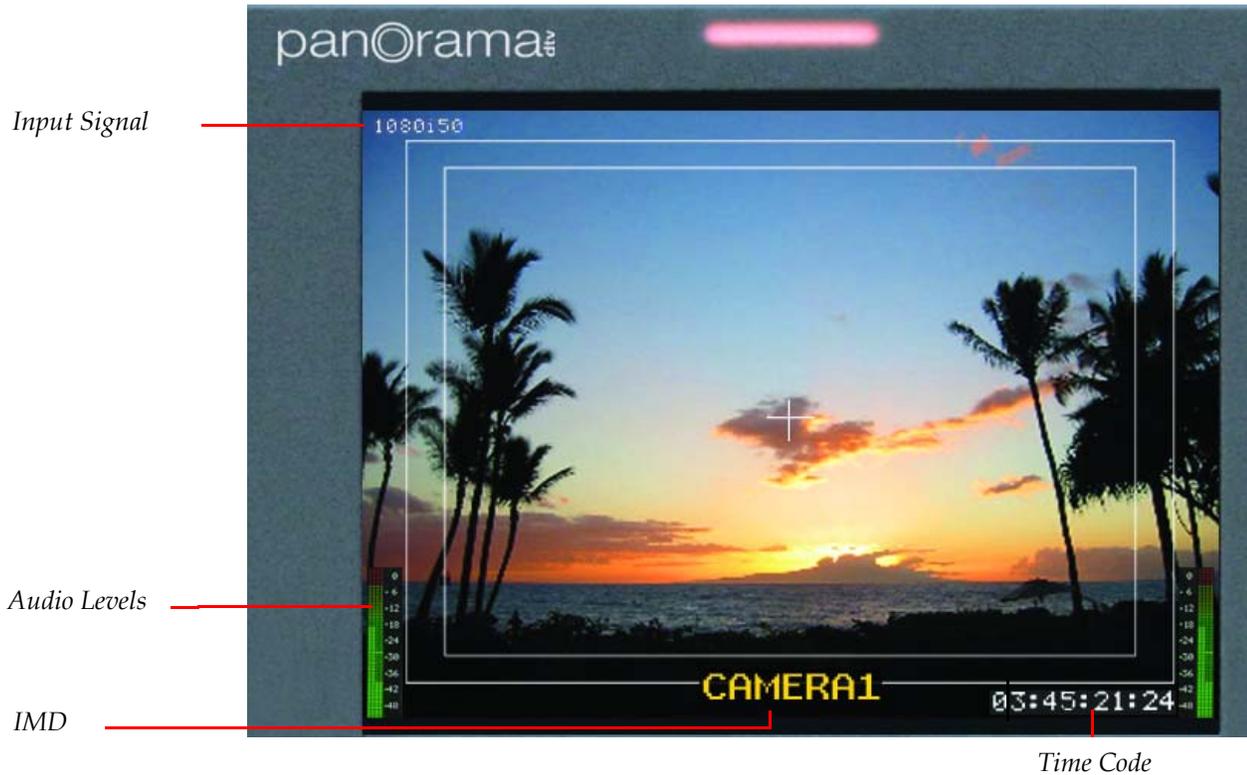
Pin	RS485 In terminal	RS485 Out Terminal
1, 2	GND	GND
3	Tx-	Tx-
4	Rx+	Rx+
5	Rx-	Rx-
6	Tx+	Tx+
7, 8	NC	NC

- **Power Connector:** To provide power to the unit, attach the supplied 100 to 240VAC to 12VDC power supply to this connector.
- **Tally Interface Connector:** This DB9 connector controls the tally lights on the front panel. Refer to [Figure 1-3](#) below for the pin out.

On-Screen Display Features

Some of the buttons and **OSD Menu** control the display of features on the screen as shown in [Figure 1-6](#) below.

Figure 1–6 Display Features



- **Input Signal:** The input signals are automatically detected and displayed here if STD DISP is set to AUTO or ON.
- **Audio Levels:** Levels for the selected audio channels are displayed on eight meters (four pair). Four meters on the left side and four on the right.
- **IMD:** The **OSD Menu** provides settings to customize the **IMD** (In Monitor Display) text area to show a line of characters, numbers, and/or some symbols.
- **Time Code:** The de-embedded time code from the HD/SD-SDI source displays in the bottom right corner.

Using the OSD Menu

A description of how to use the **OSD Menu** follows. Also refer to [Table 1-3](#) below for typical values and domain ranges for the monitors.

1. Press the **Menu** button to display the menu.
Note: If you do not press another button for approximately 10 seconds, the menu will disappear from the screen.
2. Use the **Up** and **Down** buttons to navigate through the seven sub-menu icons. The sub-menus are:
 - A. STATUS
 - B. VIDEO
 - C. AUDIO
 - D. MARKER
 - E. OSD
 - F. USER CONTROL
3. Press the **Enter** button to enter the parameter selections in the chosen sub-menu.
4. Use the **Up** or **Down** buttons to cycle through the sub-menu selections.
5. When the desired option is highlighted, press the **Enter** button to select it.
6. Use the **Up** or **Down** buttons to adjust the parameter value up or down, make a selection, or turn a function on or off.
7. Press the **Menu** button to back out of a parameter or sub-menu. Press the **Menu** button again to remove the menu from the screen.

Table 1–3 OSD Menu Structure

Menu	Parameters	Default Value	Domain Range
STATUS	FORMAT	N/A	Not configurable, signal dependent
	COLOR TEMP	D65	
	MON SOURCE	N/A	
	SCAN	UNDER SCAN	
	SD ASPECT	4:3	
	MODEL	RM-2490W-HD	
VIDEO	BRIGHTNESS	000	-116 through 139
	CONTRAST		
	SATURATION		
	SHARPNESS		
	HUE		
	RESET	YES	Loads system defaults
	COLOR TEMP	D65	D65 or D56
	R GAIN	128	0 through 255
	G GAIN		
	B GAIN		
	R OFFSET		
	G OFFSET		
	B OFFSET		
	RESET	YES	Loads system defaults
AUDIO	AUDIO MON	OFF	ON or OFF; once turned to ON, no further changes are accepted.
	MON SOURCE	MET 1	<ul style="list-style-type: none"> • MET 1 • MET 2 • MET 3 • MET 4
	VOLUME	-30db	-30 db through 0 db

Table 1–3 OSD Menu Structure (Continued)

Menu	Parameters	Default Value	Domain Range
AUDIO (Continued)	METER SIZE	SMALL	Not Configurable
	METER H POS L	000	000 through 255
	METER H POS R		
	TEST LEV	-20 DB	-20DB or -18DB
	IN A:MET 1	VU+PK	<ul style="list-style-type: none"> • VU • PK • VU+PK • NONE
	IN A:MET 2		
	IN A:MET 3		
	IN A:MET 4		
	IN A:MET 1-L	CH 1	EDB1 through EDB16, EXT1L, EXT1R, through EXT4L, EXT4R
	IN A:MET 1-R	CH 2	
	IN A:MET 2-L	CH 3	
	IN A:MET 2-R	CH 4	
	IN A:MET 3-L	CH 5	
	IN A:MET 3-R	CH 6	
IN A:MET 4-L	CH 7		
IN A:MET 4-R	CH 8		
MARKER	SAFE MARKER	OFF	ON or OFF; If SAFE MARKER is set to OFF, none of the other options on this menu are configurable.
	CENTER	OFF	ON or OFF
	90%	OFF	
	80%	OFF	
	AREA	OFF	<ul style="list-style-type: none"> • 2.35:1 • 1.85:1 • 15:9 • 14:9 • 13:9 • 4:3 • OFF

Table 1–3 OSD Menu Structure (Continued)

Menu	Parameters	Default Value	Domain Range	
OSD	STD DISP	OFF	<ul style="list-style-type: none"> • AUTO OFF • ON • OFF 	
	WFM/VT DISP		<ul style="list-style-type: none"> • VECTOR • WFM (Waveform) • OFF 	
	TC DISP		ON or OFF	
	UMD (IMD: In Monitor Display) DISP			
	OSD TLY DISP	ON	ON or OFF	
	OSD TLY MODE	RGY	<ul style="list-style-type: none"> • RG • GR • RGY 	
	LED TLY DISP	ON	ON or OFF	
	UMD FIXED SET UP			
	—	N/A	A user-definable input string of up to 16 alphanumeric characters (also includes some symbols)	
	COLOR	WHITE	<ul style="list-style-type: none"> • RED • GREEN • YELLOW • WHITE 	
	ALIGN	CENTER	<ul style="list-style-type: none"> • LEFT • CENTER • RIGHT 	
	UMD PROTOCOL			
	—		<ul style="list-style-type: none"> • LOCAL • IMAGE VIDEO • TSL V4.0 • TSL V3.1, 	
	UMD ID	000	000 through 255	
	UMD NAME (S/N)			

Table 1–3 OSD Menu Structure (Continued)

Menu	Parameters	Default Value	Domain Range
OSD (Continued)	—	N/A	A user-definable input string of up to 16 alphanumeric characters (also includes some symbols)
	UMD TLY MODE	T1T2	<ul style="list-style-type: none"> • T2 • T1 • T2T1- • T1T2-
	UMD BAUD RATE		
	—	N/A	<ul style="list-style-type: none"> • 2400 • 4800 • 9600 • 19200 • 38400 • 57600 • 115200
	TALLY SOURCE		
	—	N/A	<ul style="list-style-type: none"> • STANDARD • TSL • STANDARD+IV422 • IMAGE VIDEO 422 • IMAGE VIDEO HW
USER CONTROL	SCAN	NORMAL	NORMAL or UNDER SCAN
	SD ASPECT	4:3	4:3 or 16:9
	H/V DELAY	OFF	<ul style="list-style-type: none"> • OFF • H • V • H/V
	COLOR BAR	DISABLE	DISABLE or "ON"
USER CONFIG	VECTOR REF	75% CB	75% CB or 100% CB
	OSD CONTROL	ON	ON or OFF

Table 1–3 OSD Menu Structure (Continued)

Menu	Parameters	Default Value	Domain Range
USER CONFIG (Continued)	WFM/VT MODE	SOLID	<ul style="list-style-type: none"> • SOLID • 75% • 50% • 25%
	USER1	SCAN	<ul style="list-style-type: none"> • AUDIO SOURCE • OSD CONTROL • AREA MARKER • SAFE MARKER • WFM DISPLAY • H/V DELAY

Programming the Hot Key Buttons

The Enter Button

When the **OSD Menu** is not displayed, you can press the **Enter** button to quickly adjust the following parameters:

1. **VOLUME:** This option regulates the volume from -30db to 0db.
2. **BRIGHTNESS:** This option regulates the video brightness from -116 to 139, where 0 is the typical value.
3. **CONTRAST:** This option regulates the image contrast from -128 to 127, where 0 is the typical value.
4. **SATURATION:** This option regulates the color saturation of the image from -128 to 127, where 0 is the typical value.
5. **SHARPNESS:** This option regulates the sharpness of the image from 0 to 15, where 0 is the typical value.
6. **HUE:** This option regulates the hue of the image from -32 to 31, where 0 is the typical value.

Note: By selecting the DEFAULT option in the CONFIG sub-menu, you can reset the parameters of the BRIGHTNESS, CONTRAST, SATURATION, SHARPNESS, and HUE options to zero (0).

The User Buttons

You can use the **User** buttons as a hot keys. Assigning a parameter to these buttons allows that parameter to be displayed and adjusted on-screen at the press of the button without displaying and navigating through the **OSD Menu**. To program the hot key:

1. Press the **Menu** button.
2. Use the **Up** and **Down** buttons to find the USER CONFIG sub-menu and press the **Enter** button to select it.
3. Use the **Up** and **Down** buttons to cycle to the USER1 selection and press the **Enter** button to select it.
4. Use the **Up** and **Down** buttons to select the following eight parameters. Press the **Menu** button to exit the sub-menu. (Refer to [Table 1-3](#) starting on [page 14](#) for the domain range for each of these parameters.)
 - AUDIO SOURCE
 - OSD CONTROL
 - AREA MARKER
 - SAFE MARKER
 - WFM DISPLAY
 - H/V DELAY

Technical Functional Overview

[Figure 1-7 on page 20](#) through [Figure 1-8 on page 21](#) show the block diagrams for each model.

Figure 1-7 RM-4290W-HD Block Diagram

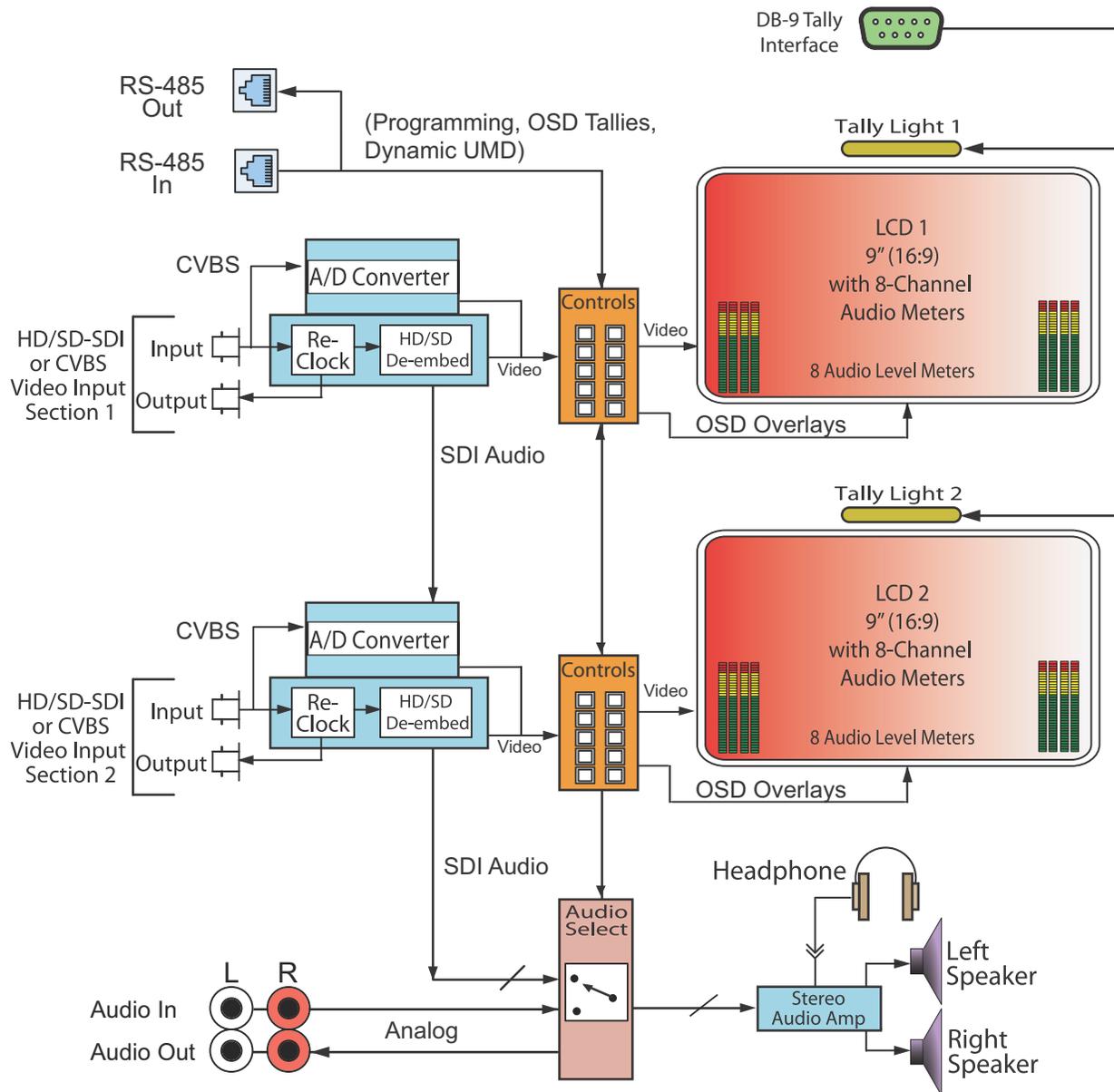
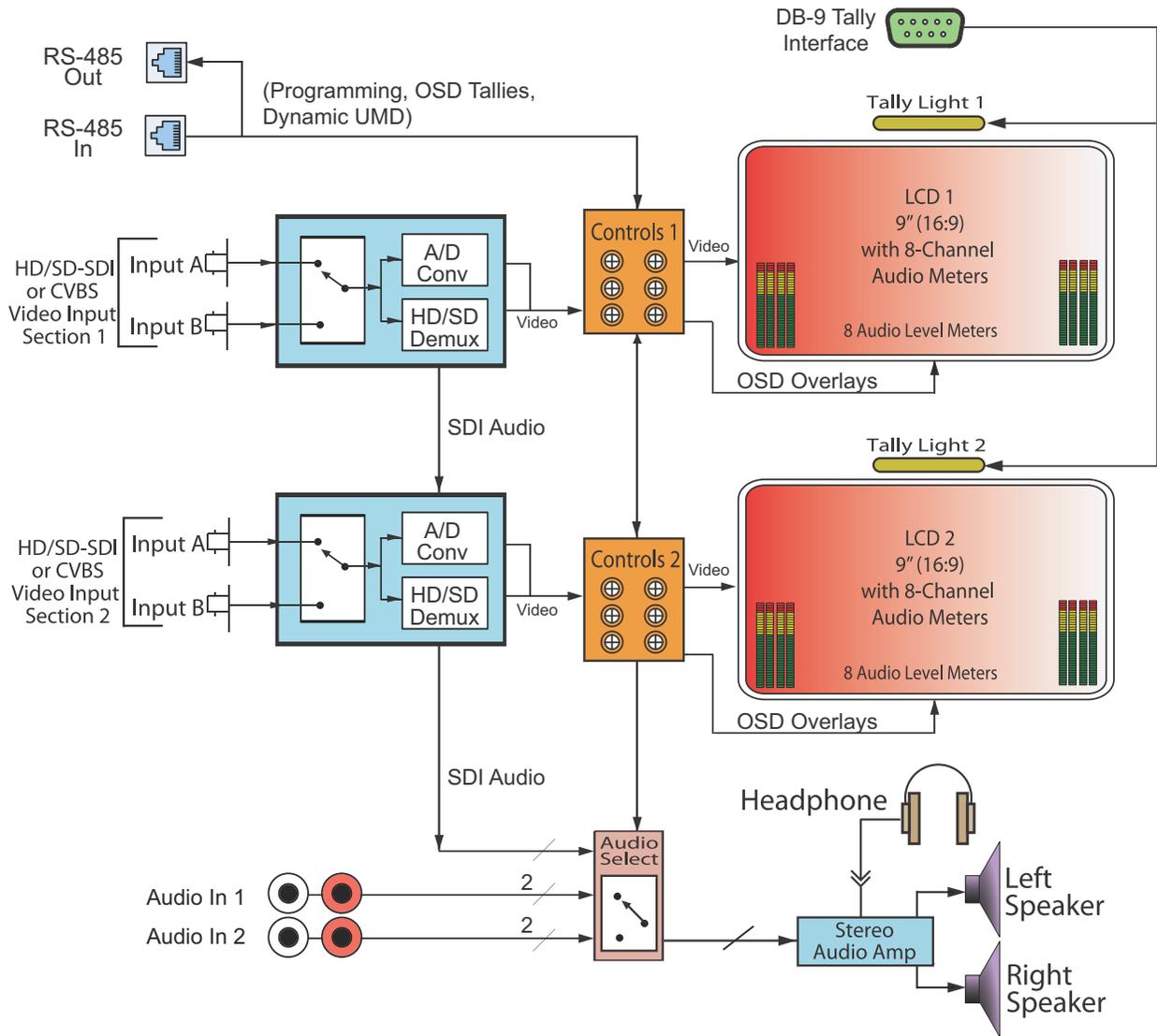


Figure 1–8 RM-4290W-2HD Block Diagram



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