RMQ Series

- RMQ-230-3G
- RMQ-230-SD
- RMQ-230-A
- RMQ-200-3G
- RMQ-200-SD
- RMQ-200-A
- RMQ-170-3G
- RMQ-170-SD
- RMQ-170-A

Quad-Split, LCD, Multi-Viewer Audio/ Video Monitors

User Guide

Part Number 821097, Revision B

Wohler CONFIDENCE.

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

Last Update

March 15, 2013

RMQ Series

Introduction

Overview

The RMQ Series quad split, LCD video monitors are high-performance, professional LCD monitors that support advanced 10-bit digital processing technology and also 3D comb filter and de-interlace, accurate scaling engine, GAMMA correction and color temperature adjustment to achieve the best possible image display.

The RMQ Series supports 4-channel 3G/HD/SD-SDI/CVBS signal and a single HDMI signal input. They can simultaneously display four signal inputs, with three typical display modes including one full screen display, one big-with-three small screen displays and four uniform size screen displays.

Topics

Safety

Important Safety Instructions

1. Read, keep, and follow all of these instructions; heed all warnings.
2. Do not use this equipment near water, rain or moisture.
3. Use only a dry cloth to clean the equipment.
4. Do not install near any heat source such as a radiator, heat register, amplifier, or stove.
5. Do not attempt to plug the unit into a two-blade outlet (with only two prongs of equal width).

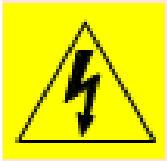
IMPORTANT: By design, these monitors will only plug into a three-prong outlet for your safety. If the plug does not fit into your outlet, contact an electrician to replace the obsolete outlet.

6. Protect the power cord from being walked on or pinched, particularly at plug's source on the equipment and at the socket.
7. Use only the attachments/accessories specified by the manufacturer.
8. Unplug the equipment during lightning storms or when unused for long periods of time.
9. Use of a cart is neither recommended nor approved by Wohler.
10. 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.
    - Objects have fallen onto the equipment; or the equipment has been exposed to rain or moisture, or liquid has been spilled onto the equipment.
    - The equipment does not operate normally.
    - The equipment has been dropped.

Safety Symbols

WARNING:



The symbol to the left warns of electric shock hazard inside the unit. Disconnect the power cord before removing access panels when installing upgrades. Only qualified service personnel are to operate the equipment with covers removed, and are to exercise caution to avoid personal injury.

Installation Recommendations

Heat Dissipation

The ambient temperature around the unit should not exceed 40° Celsius (104° Fahrenheit). Allow plenty of space around the unit for air circulation.

Mounting/Bracing

Stands for desktop mounting are provided. The fixed desktop stand resists tipping over. The adjustable stand may need bracing when raised to its higher positions.

Wall mounting kits (not provided) are available for semi-permanent installations. Ensure that the lock hardware will resist movement from mobile vehicles or seismic vibrations.

Connections and Cable Recommendations

We recommend that you limit the length of the cables that you use for feeding HD-SDI signals sources to the HD-SDI inputs of the RMQ Series units and that you use a Belden 1694A cable (or equivalent). The HD-SDI inputs (**IN1** and **IN4**) can be up to 150 meters (492 feet) in length for 1.5 Gbps (HD), more for 270 Mbps (SD) and less for 3Gbps.

Note: HDMI 1.3 or 1.4 cable lengths of 2m (6 feet) are guaranteed to work well. Four meters (12 feet) lengths of high quality cable should work well enough, but is not guaranteed for all situations. Longer HDMI cables often degrade signal quality. Active extender transmitter/receiver pairs can be used to cover long distances.

Electrical Interference

Be careful to properly terminate/ground signals and avoid mismatched cable types and other similar causes of undesired reflections in digital signal systems. If severe enough, such reflections can result in corruption of the digital data stream. As with any audio equipment, maximum immunity from electrical interference requires the use of shielded cable. The internal circuitry ground is connected to the chassis.

Power

The unit comes with a standard 19VDC/4.7 A external power adapter and connects an A/C mains power source (65W, 100 to 240 VAC, 50/60Hz) through the IEC connector provided on the power adapter.

When the mains plug or appliance coupler is used as the disconnect device, the disconnect device connection should remain accessible to be operable.

Unpacking and Installation

Contents

While unpacking the components, verify that none of the components are damaged.

Also verify that the box contains all of the following:

- Monitor
- Base

- Base board with screws
- Adapter (19V)
- Power cord
- User guide CDROM
- Warranty card

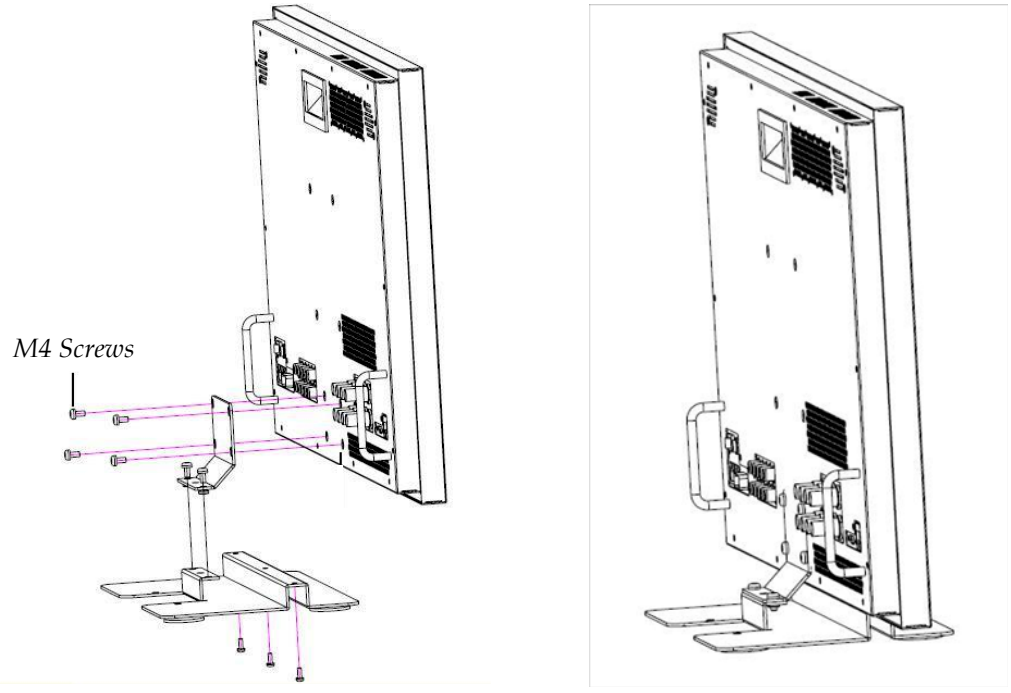
Mounting

The RMQ Series monitor comes standard with two table top stands: one fixed and one adjustable.

Alternatively, you can order the rack mount kit separately.

Refer to Figure 1–1 on page 5 while installing the fixed base onto the monitor. Refer to the instructions included with other mounts when used.

Figure 1–1 RMQ Fixed Base Installation



Before *After*

1. Install the base to the monitor.
2. Place the monitor on a solid static-free surface.
3. Connect the power cord to the rear panel of the monitor and to mains power.
4. Connect the signal inputs to the rear panel.
5. Press the **Power** switch (DC IN) on the rear panel of the monitor.

Features

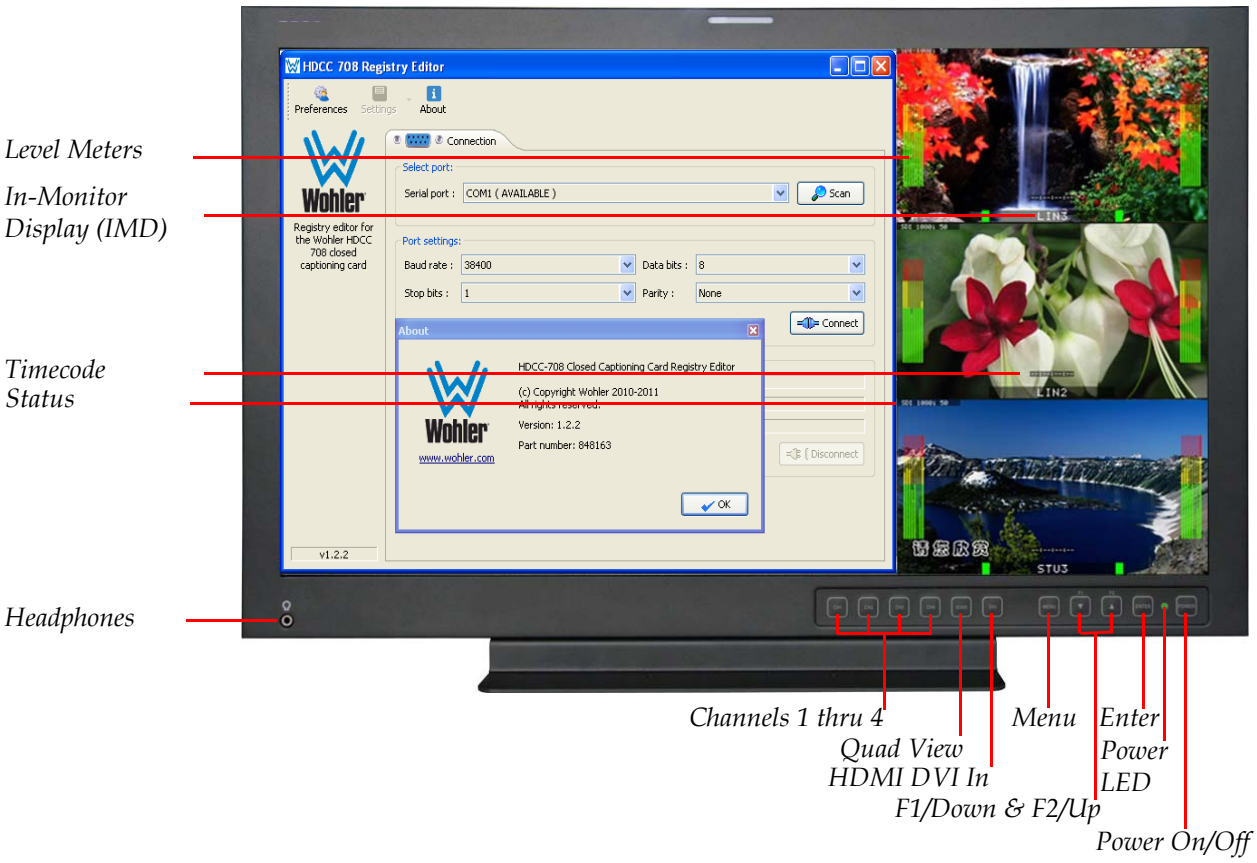
The RMQ Series monitors provide the following features:

- 178° viewing angle
- Multi-format analog and digital audio signals
- Four of 5 input signals (4 x SDI/CVBS, 1 x HDMI)
- Adjustment of the parameters for each channel
- High-quality waveform or vector monitoring (for CH1 and CH3 in quad view)
- Embedded SDI or stereo analog audio through speakers or headphones
- Audio bar graph meters, up to sixteen
- Stereo analog audio line output of selected channel
- Area, safety, and center markers
- Closed captions for CVBS
- Pre-set or user-adjustable color temperature per channel
- Time code for SD-SDI in ANC-packet form
- Dynamic OSD/IMD tally
- HDMI output for a larger display

Front Panel Features

The following feature descriptions refer to Figure 1–2 below.

Figure 1–2 RMQ Front Panel



- **Status**: The status is displayed in the upper left corner of each window, and includes the input channel number and signal format. Operation is defined in the OSD CONFIG FORMAT DISPLAY menu.

- **Level Meters**: Displays up to 16 channels, 8 on the left and 8 on the right. Define the meters setup in the AUDIO CONFIG AUDIO SOURCE and METER DISPLAY menu options.

- **IMD**: The 16 characters of the in-monitor display (IMD) can be displayed in red, green, yellow, or white. OSD CONFIG IMD DISPLAY, IMD COLOR, and IMD CHAR define the static operation. The second page of OSD CONFIG defines the dynamic IMD and OSD tally operations.

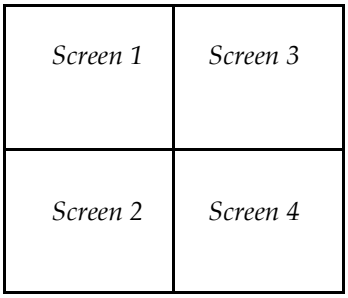
- **Timecode**: The display format for the timecode is HH: MM: SS: FF. In the event no timecode is available, the monitor will display **--:--:--:--**. Time code is currently available for SD-SDI ANC-packetized only.

- **Headphones**: This 1/8" jack receives a standard mini-headphones plug and provides stereo audio. Inserting a plug here, wired or not, will mute the speakers.

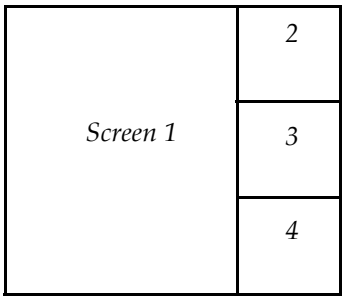
- **Channels 1 thru 4**: Pressing each of these buttons displays one full screen with the input signal connected to the corresponding input on the rear panel. See Specifications on page 23 for available input types. The audio source (as defined for that channel's AUDIO CONFIG menu) will follow the last selected video channel with these buttons. The menus' channel number also follows the last channel button pressed.

- **QUAD**: Pressing this button toggles between quad view (shown in Figure 1–4 on page 10) and one-big-and-three-small (as shown in Figure 1–2 on page 7). See also Figure 1–3 below for screen identification.

Figure 1–3 Screen Identification



Quad View



One-Big-with-Three-Small View

- **DVI (HDMI In)**: Pressing this button toggles between HDMI and NONE. Set this button to HDMI when you want to display a HDMI input, and set it to NONE when you want SDI input. This control only functions for Channel 1. HDMI jack is provided. DVI-D input requires an adapter (not provided).

- **Menu**: Pressing this button displays the on-screen display (OSD) Menu. Press MENU again to revert one menu level or exit out of MENU mode.

- **F1/Up and F2/Down**: After pressing the **MENU** button, press **Up** or **Down** to move within submenus. When not in **MENU** mode, **F1** and **F2** are programmable hot keys. Refer to User Config Menu on page 18 for details.

- **ENTER**: After pressing the **MENU** button, pressing this button selects the current menu or menu option. Changes are previewed, but not saved, until you press the **ENTER** button again.

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

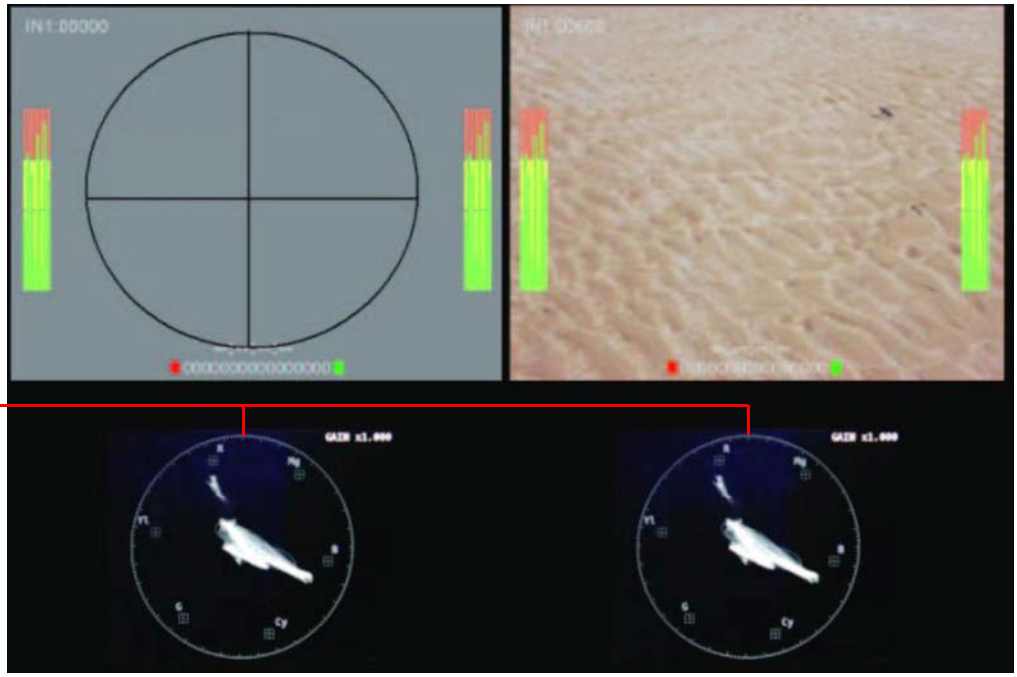
  - VOLUME: Adjusts the volume from 0 to 30.
  - BRIGHTNESS: Adjusts the video brightness from 0 to 100, where 50 is the typical value.
  - CONTRAST: Adjusts the image contrast from 0 to 100, where 50 is the typical value.
  - CHROMA: Adjusts the color saturation from 0 to 100, where 50 is the typical value.

- **Power LED**: Lights red in standby mode and green when on.

- **POWER On/Off**: Toggles the monitor to on or standby mode.

- **Waveform/Vector**: (Figure 1–4 on page 10) In quad screen view, Screen 2 displays the waveform or vector for Screen 1 and Screen 4 displays the waveform or vector for Screen 3.

Figure 1–4 RMQ Waveform / Vector Display



Rear Panel Features

The descriptions of the rear panel connectors refer to Figure 1–5 below and Figure 1–6 and Figure 1–8 on page 12.

Figure 1–5 RMQ Complete Rear Panel

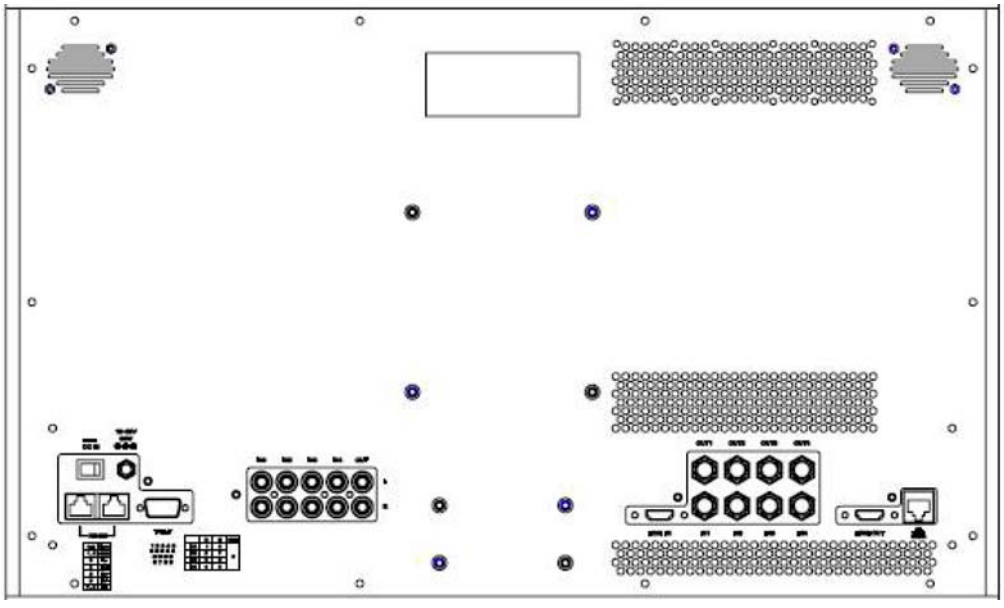
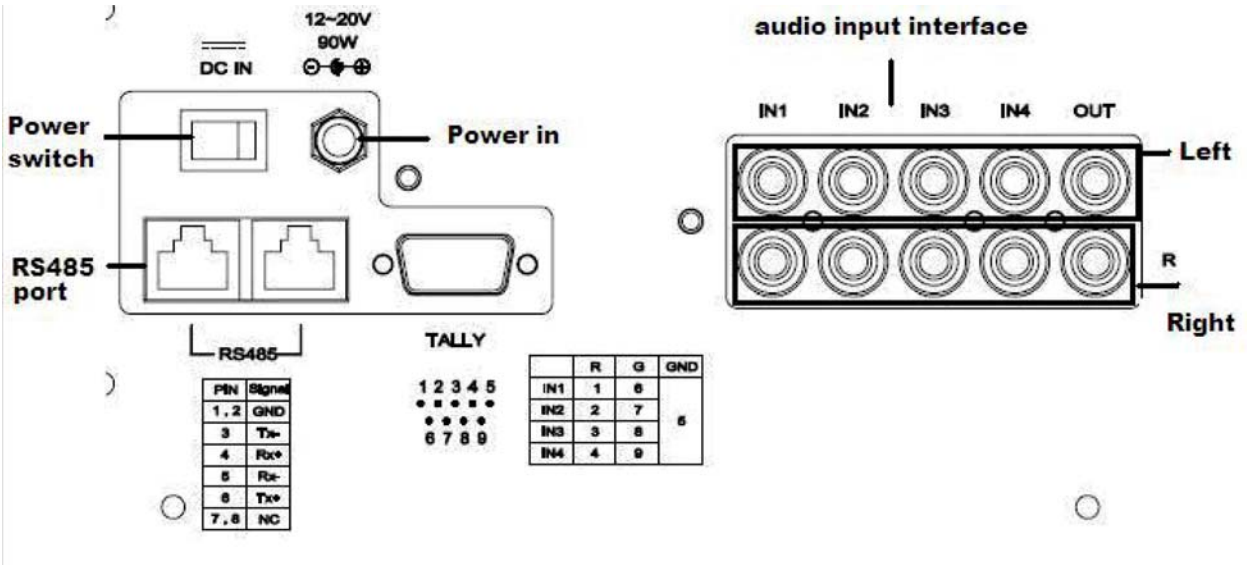


Figure 1–6 RMQ Rear Panel - Left



- **DC IN** (jack): Accepts included power plug from an adapter.
- **Power** (Rocker Switch): Toggles power to the monitor on or off.
- **RS485 Ports** (2 RJ-45): Input and output connectors for external control. Refer to Figure 1–7 and Table 1–1 on page 11 for details.

Figure 1–7 RS485 RJ45 Connector Pin Map

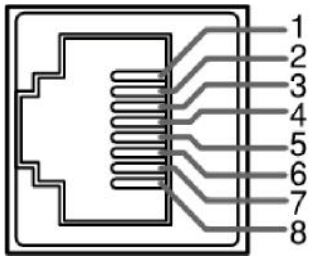
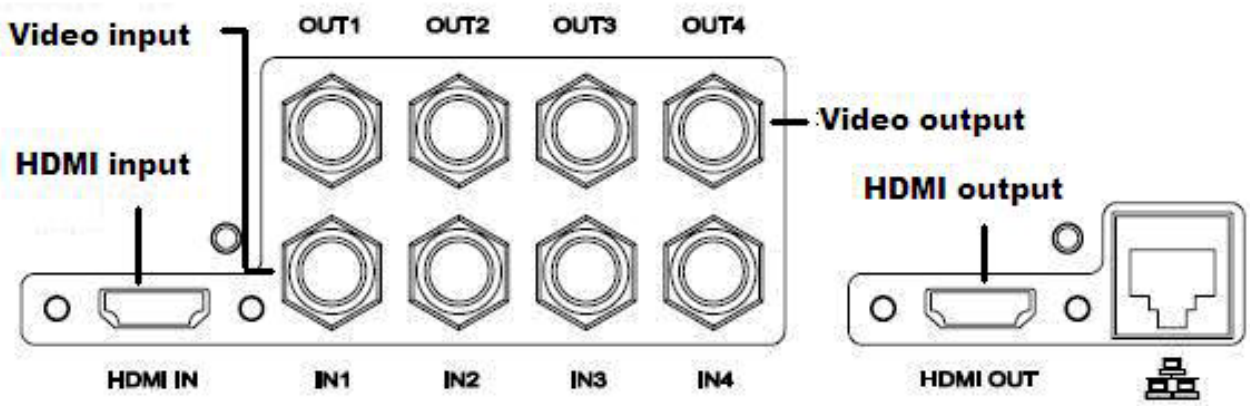


Table 1–1 RS485 Pin Out

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

- **Tally** (DB-9 F): Tally input.
- **Audio Inputs** (8 RCA) **and Outputs** (2 RCA): Each input pair (one for each channel) accepts standard analog audio. Output is from last (video) channel selected as heard from the speakers/ headphones.

Figure 1–8 RMQ Rear Panel - Right



SDI/CVBS Video Inputs (4 BNC) **and SDI Outputs** (4 BNC): Only SDI video, buffered from SDI inputs, is output. No analog to digital or digital to analog conversion is available at this time.

HDMI IN: Alternate input for Channel 1. Accepts HDMI and DVI-D video (adapter required). No audio is available from this input.

HDMI OUT: Sends the main display image, minus menus, to an external monitor.

Ethernet (RJ-45): Network interface for upgrades—reserved for future use.

Using the OSD Menu

Configuring the RMQ Series monitors is accomplished in the OSD MENU. Each of the menus in the OSD MENU is explained below.

1. Press the **MENU** button to display the menu.

2. Use the **Up** and **Down** buttons to navigate through the seven sub-menu icons.

3. Press the **ENTER** button to move into the parameter selections in the chosen sub-menu. The submenus are:

   - STATUS (Read-only; CH indicates the channel being configured)
   - COLOR TEMP
   - MARKER
   - AUDIO CONFIG
   - USER CONFIG
   - OSD CONFIG
     1) Page 1: IMD DISPLAY
     2) Page 2: IMD PROTOCOL

4. Use the **Up** or **Down** buttons to cycle through the sub-menus and 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 **ENTER** button to save the parameter change and return to the sub-menu level.

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.

Status Menu

Note that none of the options displayed on the STATUS menu are editable.

Table 1–2 Status Menu

Parameters	Default Value	Domain Range
CH (Channel)		Display only; Non-selectable. The values vary depending on input signal type and configuration settings.
COLOR TEMP		
ASPECT MODE		
SCAN MODE		
IP ADDRESS		
SUBNET MASK		
SERIAL NO.		
MODEL		

Color Temp Menu

Important: To modify the options in the COLOR TEMP menu, COLOR TEMP must be set to USER.

Table 1–3 Color Temp Menu

Parameters	Default Value	Domain Range
COLOR TEMP	D65	Selects the color temperature that will become the basis for adjustments where: • D93 = 9300K • D65 = 6500K • D56 = 5600K • USER (Enables the rest of the options)
RED GAIN	Factory Calibrated	0 to 255
GREEN GAIN		
BLUE GAIN		

Table 1–3 Color Temp Menu (Continued)

Parameters	Default Value	Domain Range
RED BIAS	Factory Calibrated	0 to 63
GREEN BIAS		
BLUE BIAS		
RESET	Resets gain and bias to their factory defaults.	

Marker Menu

Important: MARKER is disabled when SCAN mode is NATIVE, or when the input signal is DVI or VGA.

Table 1–4 Marker Menu

Parameters	Default Value	Domain Range
AREA MARKER	16:9	Select the area marker aspect ratio according to the display aspect only when the aspect ratio is 16:9. • OFF: turns area marker off • 4:3 • 13:9 • 14:9 • 15:9 • 16:9 • 1.85:1 • 2.35:1
CENTER MARKER	ON	ON (enabled) or OFF (disabled)

Table 1–4 Marker Menu (Continued)

Parameters	Default Value	Domain Range
SAFETY MARKER	OFF	Setting the picture safe area size marker for the aspect ratio (determined by the button to which the aspect function is assigned) and scan control, where: • OFF • 80% • 85% • 88% • 90% • 93% • 95%
MARKER LEVEL	1	Sets the luminance (white level or brightness) to display safety, center, and area marker line, where: • 1 = 100% • 2 = 75% • 3 = 50%
MARKER MAT	OFF	Sets the area marker mat transparency, where: • OFF = Normal background, use line for area marker edge only • HALF = 50% Background brightness • BLACK = Black

Audio Config Menu

The menu sets up the audio sources for each channel according to the last **CH 1** to **CH 4** button pressed. Speakers and the analog Audio Output follow **CH 1** to **CH 4** selections accordingly.

Table 1–5 Audio Config Menu

Parameters	Default Value	Domain Range
AUDIO SRC	NONE	Used to select the audio source type, where: • OFF = Disables audio source • EXT = Analog audio Inputs CH1 to CH4 selected • EBD = Embed audio (only for SDI inputs)
SPEAKER L	CH1	Select embedded audio for the left speaker/headphone, line output: • OFF • CH1 thru CH16
SPEAKER R	CH2	Select embedded audio for the right speaker/headphone, line output: • OFF • CH1 thru CH16
METER DIS	16CH	Select the audio meters to display (divided evenly between the left and right sides of the monitor: • OFF • 2CH • 4CH • 6CH • 8CH • 10CH • 12CH • 14CH • 16CH

Table 1–5 Audio Config Menu (Continued)

Parameters	Default Value	Domain Range
ACTIVE ONLY	OFF	Control the audio level meter with the audio source: ON (enabled) or OFF (disabled)
REF LEVEL	-20DB	Select the reference level: -20DB or -18DB
OVER LEVEL	-10DB	Select the overload level: • -10DB • -8DB • -6DB • -4DB • -2DB

User Config Menu

Table 1–6 User Config Menu

Parameters	Default Value	Domain Range
BACKLIGHT	N/A	Select the backlight brightness: 0 through 30
LANGUAGE	english	Select the language for the menu: • ENGLISH • CHINESE
PHASE	50	Select the hue/tint adjustment when the video is analog in NTSC format: 0 through 100
APERTURE	N/A	Select the image sharpness: 0 through 32

Table 1–6 User Config Menu (Continued)

Parameters	Default Value	Domain Range
F1 BUTTON	Marker	Select the function to assign to the function button: • MARKER • AUD METER • WAVEFORM • NATIVE • BLUE ONLY • MONO • SCAN MODE: Enables or disables display. • ASPECT MODE: Toggles between 4:3 and 16:9 scaling to match input. • H/V DELAY • UNDEF (none)
F2 BUTTON	AUD METER	
LAYOUT 2 MODE	16:9	Select the aspect ratio when the display has one-big-with-three-small screens: 16:9 or 4:3
LOCK NUMBER	N/A	Type in up to 16 characters to set a password to unlock the function buttons. Acceptable characters include all letters, numbers, and some symbols.

OSD Config Menu

The OSD CONFIG menu has two pages: The IMD DISPLAY and the IMD PROTOCOL.

OSD Display

Table 1–7 OSD Config Menu - IMD Display

Parameters	Default Value	Domain Range
IMD DISPLAY	On	ON = Displays OFF = Does not display
IMD COLOR	white	Select the color in which to display the IMD text: • RED • GREEN • YELLOW • WHITE
IMD CHARACTER	WOHLER	The IMD text can contain up to 16 characters including all letters, numbers, and some symbols.
TC DISPLAY (Timecode)	on	ON = Displays SD-SDI ANC-VITC/ LTC. OFF = Does not display.
WAVE FORM	off	Select the graph to display: • OFF • WAVE FORM • VECTOR 75 • VECTOR 100
WAVE OVER LIMIT	0	Select the waveform overload limit: 0 through 100
WAVE UNDER LIMIT	0	Select the waveform under limit: 0 through 100

Table 1–7 OSD Config Menu - IMD Display

Parameters	Default Value	Domain Range
FORMAT DISPLAY	off	Select to display the video information: • OFF • AUTO • ON
This following feature is not currently available.		
CC	off	Select to display closed captions for CVBS signals only: • OFF • CC1 • CC2 • CC3 • CC4 • TEXT1 • TEXT2 • TEXT3 • TEXT4 • XDS

IMD Display

Table 1–8 OSD Config Menu - IMD Protocol

Parameters	Default Value	Domain Range
IMD PROTOCOL	Local	Select the IMD protocol you want to use: • LOCAL • UDP • TSL3.1 • TSL4.0 • IMAGE VIDEO
IMD ID	0	Select the IMD ID: 0 through 255
IMD NAME (S/N)	N/A	The IMD serial number contains up to 16 characters.
BAUD RATE	19200	Select the communications baud rate: • 9600 • 19200 • 38400
OSD TLY MODE	T1	Select the OSD tally mode: • RG: Red/Green • GR: Green only • RGY: Red/Green/Yellow • OFF: No tally light

Table 1–8 OSD Config Menu - IMD Protocol

Parameters	Default Value	Domain Range
IMD TLY MODE	T1	Select the IMD tally mode: • T1 • T2 • T1T2 • T2T1 • T1- • T2- • T1T2- • T2T1-
TLY SOURCE	Standard	Select the tally source (For more information about the tally DB-9 switch closure, refer to the information about the rear panel in Figure 1–6 on page 11.): • STANDARD • IMAGE VIDEO HW • IMAGE VIDEO 422 • STANDARD + IM422 • TSL

Specifications

The general specifications of the RMQ Series monitors are listed in Table 1–9 below.

Table 1–9 RMQ Specifications

Specification	RMQ-230s	RMQ-200s	RMQ-170s
Dimensions (including the fixed table stand)	14.37″ H x 21.85″ W x 6.26″ D ((365mm H x 555mm W x 159mm D)	13.0″ x H x 19.0″ W x 6.3″ D (330 mm H x 482 m W x 159 mm D)	12.1″ H x 17.2″ W x 6.3″ D (308 mm H x 437 mm W x 159 mm D)
Shipping Weight	16 lbs. (7.26 kg)	14.1 lbs. (6.41 kg)	12.1 lbs. (5.50 kg)

Table 1–9 RMQ Specifications

Specification	RMQ-230s	RMQ-200s	RMQ-170s
LCD Dimension	23″	20″	17″
Aspect Ratio	4:3/16:9 (native)		
Resolution	1920 H x 1080 V	1600 H x 900 V	1366 H x 768 V
Color Depth	16.7M, 24-bit		
Viewing Angle	178° (H/V)		
Brightness	250 cd/m^2		350 cd/m^2
Contrast Ratio	1000:1		

Table 1–10 below lists the I/O specifications.

Table 1–10 RMQ Specifications

Specification	RMQ Values
Video Inputs	• 4 BNCs: CVBS, 3G/HD/SD-SDI (supports embedded audio) • 1 DVI -D / HDMI: alternate **IN1**
Video Outputs	1 HDMI: HDMI (1080p50 or 1080p60)
Audio Inputs	8 RCAs: Analog stereo for EXT sources
Audio Outputs	2 RCAs: Analog stereo (monitoring, same as speakers)

Table 1–11 below distinguishes each of the RMQ models.

Table 1–11 RMQ Distinctions Among Each Model

Category	Specification	3G	HD	SD	A
3G-SDI	1080p: (60/59.94/50/ 30/29.97/25/24)	✓	✓	✓	✓
HD-SDI	1080i: (60/59.94/50) 1035i: (60/59.94)\ 720p: (60/59.94/50)		✓	✓	✓
SD-SDI	480i: (60/59.94) 576i: (50)			✓	✓
Analog	PAL NTSC				✓

Note: 1080psF will display as the equivalent 1080i rates listed above. Segmented-Frame (sF) scan is not supported.

Table 1–12 below lists the specifications for CVBS inputs.

Table 1–12 RMQ CVBS I/O Specifications

Specification	RMQ Values
Signal Type	NTSC, PAL
Signal Amplitude	1V peak-to-peak ±3 dB
Impedance	75 Ω
Return Loss	> 40 dB ±5 MHz
DC Offset	0V ±0.05 V
Frequency Response	±0.2 dB to 5 MHz
Differential Gain	< 1%
Differential Phase	< 1.5°

Table 1–13 below lists the specifications for SDI inputs.

Table 1–13 RMQ SDI Specifications

Specification	RMQ Values
Signal Compliance	SMPTE 424M/425M-A, SMPTE 292M, SMPTE 259M, SMPTE 297M (audio)
Connector	BNC per IEC 169-8
Impedance	75 Ω
Return Loss	>18 dB at 5 to 270 MHz >15 dB at 270 MHz to 1.5 GHz >10 dB up to 3 GHz
Maximum Signal Level	800 mV peak-to-peak, 10%
Signal Amplitude	800 mV peak-to-peak, 10%
DC Offset	0 V ±0.5 V
Overshoot	<10%
Total Jitter	<0.2 UI
Rise and Fall Time	3G (3Gb/s): <135 ps HD (1.5 Gb/s): <270 ps SD: <700 ps

Technical Function Overview

Figure 1–9 below illustrates the overall functionality of the RMQ Series monitors.

Figure 1–9 RMQ Block Diagram