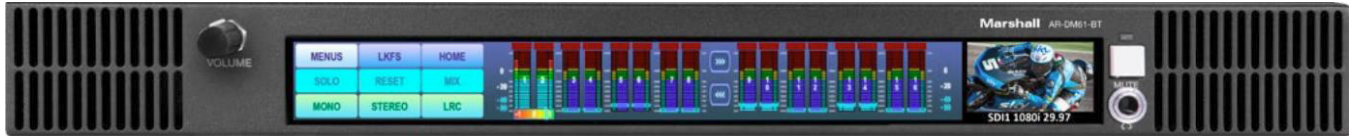


## AR-DM61-BT

### Multichannel Digital Audio Monitor



## User Manual



# Introduction

The Marshall AR-DM61 audio monitor rack has an advanced design with the ability to adapt to future needs. Its sonic performance is impressive, exceeding the capabilities of many larger 2RU designs. In addition, the convenient front panel touch screen is the first in the industry capable of providing high resolution 96-step audio metering or 64 channel side-by-side audio bars in the same unit. This breakthrough design removes many limitations found in other products. Built-in support for most common input types. Easy upgrades for Dolby, Dante / AES-67 options.

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## 1. Features

### Touch Screen Convenience and Flexibility

- Eliminates most mechanical components
- Quickly switch display modes between multi-channel and high-precision
- Layout design not “frozen”

### Integrated Video Display

- Provides visual confirmation of selected SDI input
- Displays selected audio channel numbers and video format

### High Performance Audio – Punches Above Its Weight

- Matches or exceeds most 2RU designs
- Enough “punch” for the noisiest server rooms

### One Model Supports Multiple Input Types

- Two 3G SDI / MADI (auto-detection) Inputs - Standard
- 8 Channels AES / EBU Digital - Standard
- 8 Channels Analog Balanced - Standard
- Up to 64 Dante / AES-67 Channels - Option
- Dolby Decode - Option Plug-in Card

### Network Control

- Web Browser Configuration

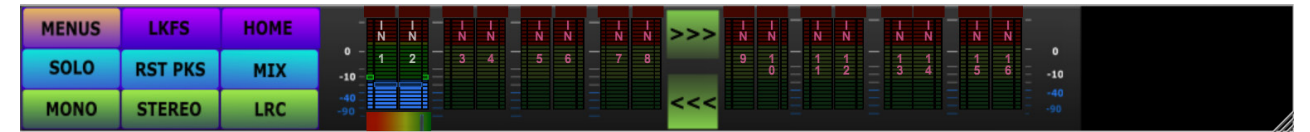
### Compact 1RU Design Saves Rack Space

## 2. Package Contents

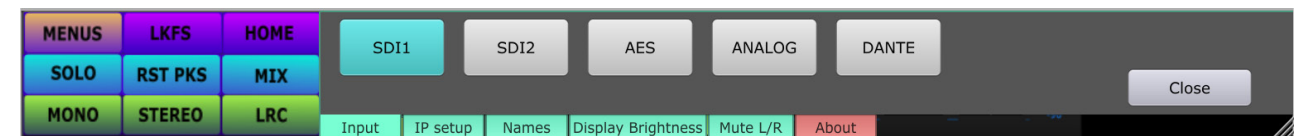
1. AR-DM61 main chassis
2. 24-volt DC universal power supply (120/240 VAC, 50/60Hz)

## 3. Quick Start Guide

**Powering up** - Once power is initially applied, please allow approximately 30 seconds for the unit to become functional. When the unit is ready for operation, the audio bars will display. You should see something like this:



**Basic operation** – First, select the Menu button, then select the desired input from the selections that appear.



Use the front panel Volume knob to adjust the sound to a comfortable level. The unit may be quickly silenced by pressing the front panel Mute button.

**Note:** When SDI 1 or SDI 2 is selected as the input source, it will also be routed to the SDI / MADI output connector on the back panel. When it is connected to a video monitor, it will “follow” the input selection. This feature is intended as a convenience only and is not intended to replace a production router. MADI output from this same connector is currently in development and not enabled in this software version.

**Monitoring Mode Selection** - Quick access to common monitoring modes is available by selecting MONO, STEREO or LRC depending on what you wish to hear.

**MONO** – Single audio channel selected and played from both speakers.

**STEREO** – A pair of audio channels is selected. The lower channel number will be heard from the left speaker and the higher channel number from the right speaker. In this mode, a phase “correlation” meter appears just below the HOME button.

**LRC** – Three channels are selected with the Center choice heard from both speakers.

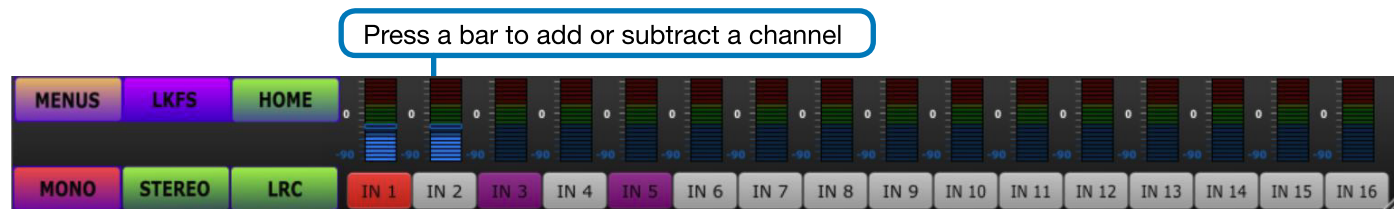
After selecting the desired monitoring mode, simply tap the **BUTTON** below the displayed audio bars to select channel or channels to monitor. In the example below, **STEREO** mode has been chosen and Channel pair 3 / 4 was selected for monitoring.



**Mix Plus or Mix Minus Feature** – By pressing a meter **BAR**, channels may be quickly added or subtracted from a monitor mix.

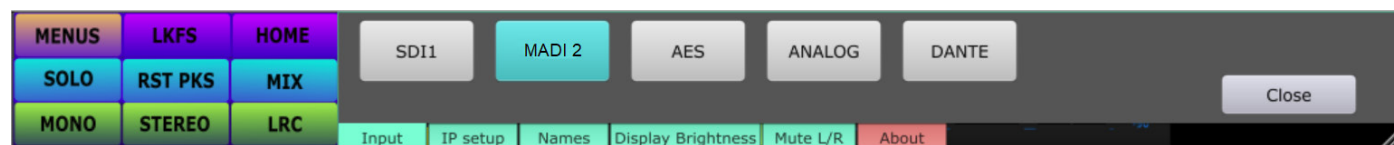
For example: If it is then desired to listen to **ONLY** channel 3, press the meter **BAR** for channel 4 and it will drop out of the mix. Press any other bar or bars in the same group of 8 channels and they can be **ADDED** to the mix.

In the picture below, **MONO** mode has been chosen then channels 3 and 5 have been **ADDED** to the mix.

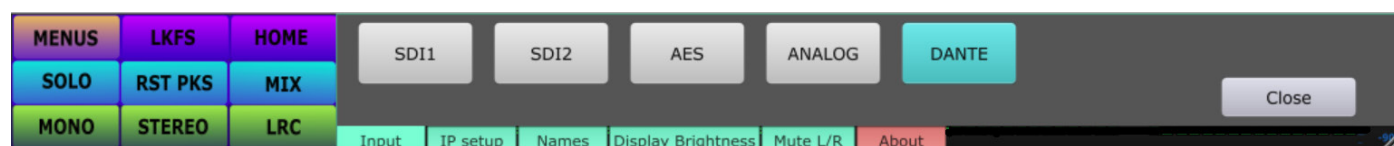


**Note:** Pressing the **HOME** button will return to the normal display and default to channel 1 / 2 monitoring.

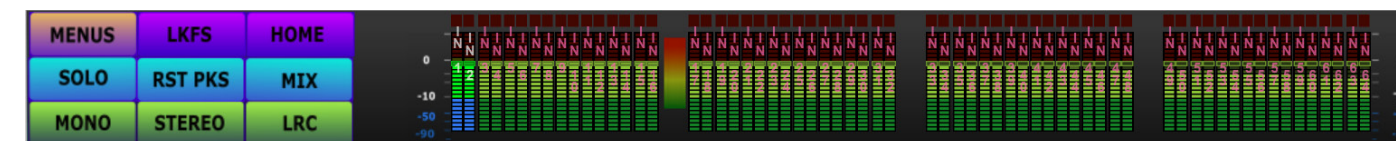
MADI and Dante input types are handled somewhat differently from the other input types. MADI is a standard feature and is input via either of the SDI input connectors. When MADI is detected on one of the inputs, it will automatically appear in place of the SDI choice as shown below. In this picture, a MADI source is connected to SDI input 2.



The Dante option is selected from the Menu page when the Dante upgrade board is present. Sources are routed using the Dante Manager™ which is a free download from Audinate®.

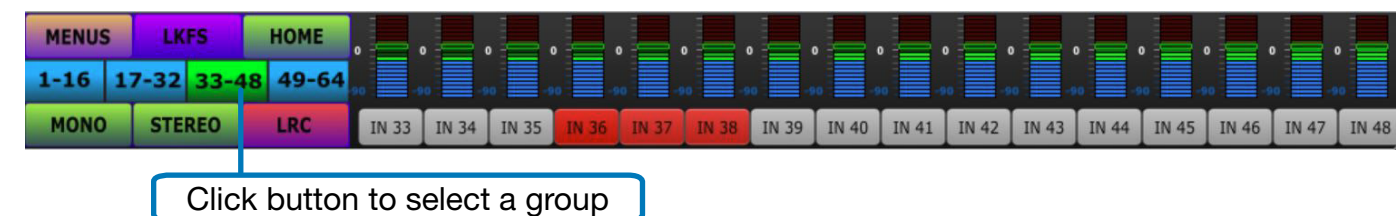


MADI and Dante modes support up to 64 audio channels. All 64 can be displayed at once as seen in the figure below. This can be quite useful finding “stray” or missing channels. However, because the meter bars become very small, this is not the ideal display mode for selecting individual channels or stereo pairs.



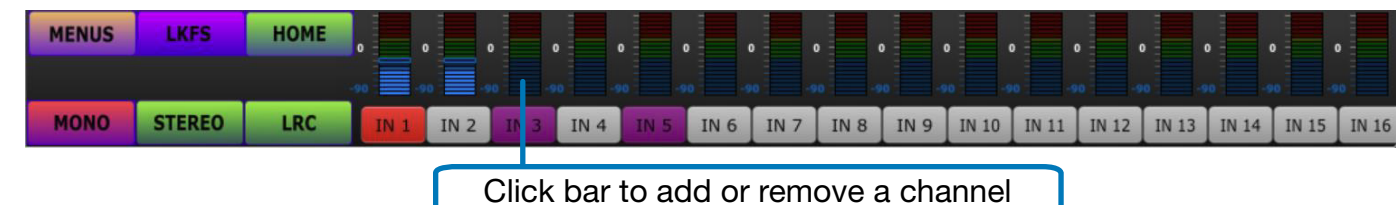
A group of 16 channels may be isolated by first selecting **MONO**, **STEREO** or **LRC**, then select one of the channel ranges to narrow the focus to a group of 16 channels. From there it is quite easy to monitor the desired channels in that group.

In the example below, **LRC** mode and channel group 33 – 48 have been selected. Channels 36, 37 and 38 are being monitored as Left, Right, Center from the speakers.



An arbitrary group of channels may be added or subtracted from the monitor mix by selecting the meter bar above the desired channel(s). In the example below, **MONO** was selected then channels 3 and 5 were added.

**NOTE:** Only channels in a cluster of 8 may be monitored in this way. That is, any channels from 1 – 8 or 9 – 16, etc. may be combined but channels in different 8 channel groups, say 7 and 15 may not be combined.





### 4. Short Cut Buttons

The Short Cut Buttons are the group of 9 buttons to the left side of the display. The figure below shows them in their most common configuration.

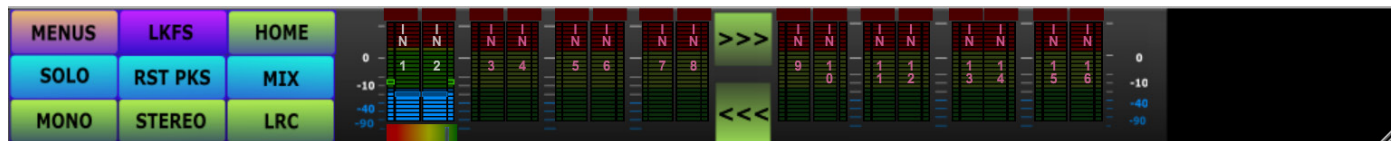


**HOME** – Selecting HOME reverts the unit to the default display mode. That is, vertical bars, STEREO mode with Channels 1 & 2 selected as Left & Right.

**LKFS** – Produces a single horizontal bar representing the LKFS weighting and averaging algorithm. (Currently under development). Pressing the RST PKS button on this screen restarts the averaging process and resets the peak markers.



**SOLO** – Solo mode has much the same effect as **MONO** mode except that the display style does not change. Tap on the desired meter bar to hear audio from that single channel. The selected channel will be heard from both speakers.

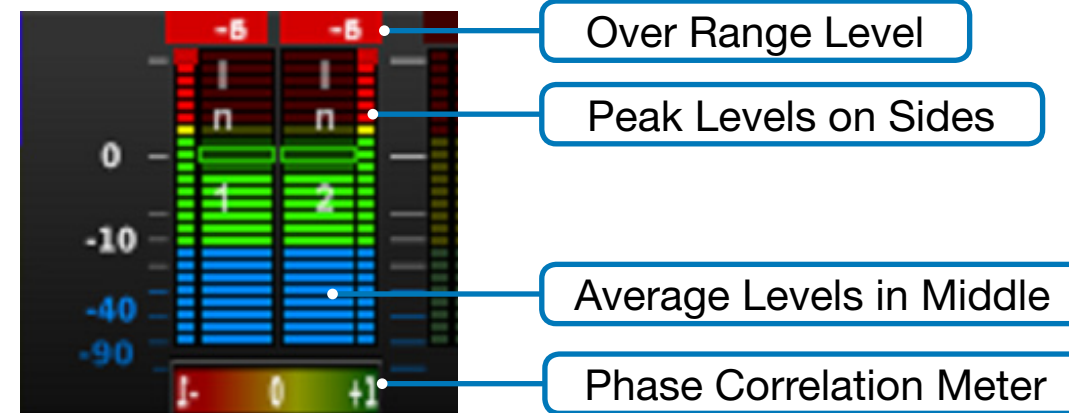


**RST PKS** –The “Reset Peaks” button clears all audio bar peak hold “top hat” markers back to their base position.

**MIX** – The MIX button enables a down-mix from multiple channels. The particular mix that is heard when the MIX button is selected depends on settings made through the web browser interface (see Network Control section below). When no changes have been made through the browser interface, the default mix is assumed for 5.1 Surround with appropriate gain scaling. Custom mixes may be created for each Input.

**MONO, STEREO, LRC** – These functions are described in **Quick Start** section above. They provide monitoring of one, two or three source channels respectively.

### 5. Audio Metering Features



The figure above shows the audio bars in their most common arrangement. A great deal of information is available at a glance including: recent Over Range Amount, current audio Peak and Average and Phase Correlation. Over Range and Peak markers are reset with the RST PKS button in the Short Cut area.

**Audio Bar Structure** – Bars are grouped in pairs. The middle portion of each pair represents the average audio level while the narrow portions show the peaks. Each has its own “peak hold” markers. Bars representing the audio channels being heard on the speakers will be highlighted. Below the selected audio pair, is a horizontal bar which is the phase correlation meter.

**Phase Correlation Meter** – The phase correlation meter registers to the right (Green) when the selected pair of channels would have best “mono compatibility”. It will register in the center when the two channels come from different sources or have little relationship to each other. Finally, it will register to the left (Red) when one of the two channels has reversed polarity or 180-degree phase shift compared to the other channel in that pair.

**NOTE:** The number of bars that will be displayed depends on the type of input selected.

**SDI Inputs** = 16 Bars displayed

**AES and Analog** = 8 Bars displayed

**Dante and MADI** = 64 Bars (can be subdivided to 16 channels using MONO, STEREO or LRC monitoring selections)

**Selecting Channels to be Monitored** – Tap on the arrow symbols “>>>” to select different channels to monitor.

### Standard Display

Press Here for High Precision Horizontal Bar

Use Arrows to Scroll to Other Channels

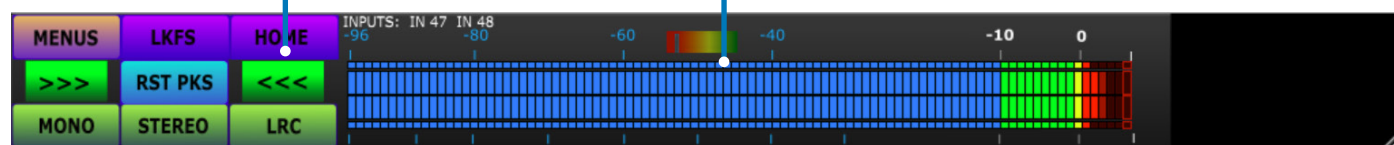


**High Precision Bars** - It is possible to monitor any selected pair of audio channels in very high precision (1db per step, 96 steps). Press on a pair of channels for just a moment and you will see a display like this.

### High Precision Display

Touch these arrows to scroll to other channels

Press and hold bars to return to normal display



A phase meter appears above the horizontal bars in this mode. Pressing the bars will switch back to standard vertical multi-channel display mode.

## 6. Video Display Features

- Program video is displayed when an SDI source is selected.
- A text overlay in the video window area shows the source type, resolution and frame rate. For example: “SDI1 1080p 59.94”.
- When MADi or Dante are selected, the entire screen surface is occupied with 64 audio bars.

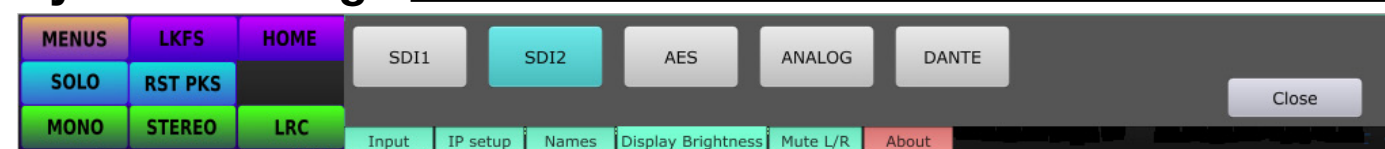


**Note:** Video display is optimized for 4:2:2 YUV color sampling. Colors may appear incorrect for 4:4:4 YUV or RGB sources.

### Supported formats / frame rates:

- 480i 59.94, 576i 50
- 720p 50, 59.94, 60
- 1080i 50, 59.94, 60
- 1080p 23.98, 24, 25, 50, 59.94

## 7. System Settings



The **MENUS** button provides access to Source Selection as mentioned previously. Smaller buttons at the bottom of the screen provide access to System Settings. These operate as follows:

- **Input** – Press this button to highlight the currently selected Input if it is not already highlighted. The selected source is highlighted pale blue. Sources that are not available (not connected to the AR-DM61-BT) are highlighted in pink.
- **IP Setup** – Press this button to display the current Ethernet IP address and MAC address. (See figure below) The addresses shown are examples, yours will likely be different. Remote setup of the AR-DM61-BT is available using a web browser. Type the address exactly as it is displayed including “:5000” into the browser search window. Convenient short-cut buttons allow for quick IP setup:
  - **SET to DHCP** – Press this button to allow the AR-DM61-BT to automatically receive an IP address from the attached network.
  - **SET to 10.0.0.219** – Press this button to quickly set the unit to a Fixed IP address compatible with “Class A” networks. Press the **SYSTEM RESET** button to establish the new address.
  - **SET to 192.168.1.219** – Press this button to quickly set the unit to a Fixed IP address compatible with “Class C” networks. Press the **SYSTEM RESET** button to establish the new address.
  - **System Reset** – Press this button to restart the AR-DM61-BT. User information such as Input Names, Mixes, etc. will not be erased.

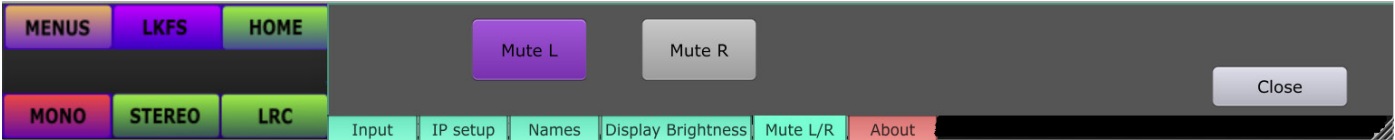


**Note:** Once a network connection is established with the AR-DM61-BT, specific IP address and other changes may be made using the web browser interface. See “Network Control” sections below.

- **Names** – For example, “IN 1” can be changed to “STUDIO 1”.  
**NOTE:** At this time, name changes may only be made through the browser interface.
- **Display Brightness** – Select this choice to adjust the front panel display brightness. Slide the dot left or right to change the level.




- **Mute L/R** – Select this to listen to the sound from only one speaker. The selected channel will be silenced. In this example, only the right speaker will be heard. Closing this screen will return the monitor to normal stereo operation.



- **About** – Displays the firmware version and build date.

## 8. Options

### Dolby®

The AR-DM61-BT is compatible with the Dolby CAT 1100 decoder card and may be ordered installed at time of purchase or the option may be added later. With this option, Dolby encoded audio on either the SDI or AES inputs will be automatically identified and indicated on the front panel display by the presence of the  logo.

Here is an example of SDI with Dolby encoding detected on channel pairs 1 / 2, 3 / 4 and 7 / 8

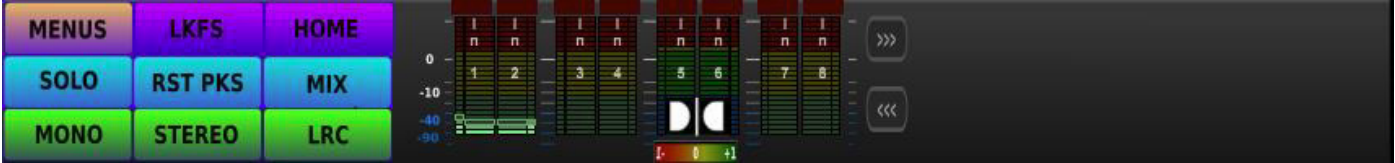
To listen to the Dolby encoded audio, select the Dolby icon below the channel pair. In this example,



channel pair 1 / 2 have been selected and the MIX button has been pressed. To return to the original display and stop Dolby decoding, select the icon in the upper right corner of the display.



The screen below, shows the AES input with Dolby detected on channel pair 5-6.



All normal listening selections like MONO, STEREO, LRC, MIX, etc. can be applied to the Dolby decoded audio.

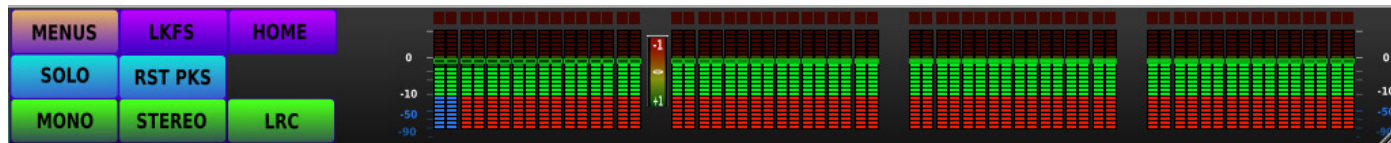


## Dante®

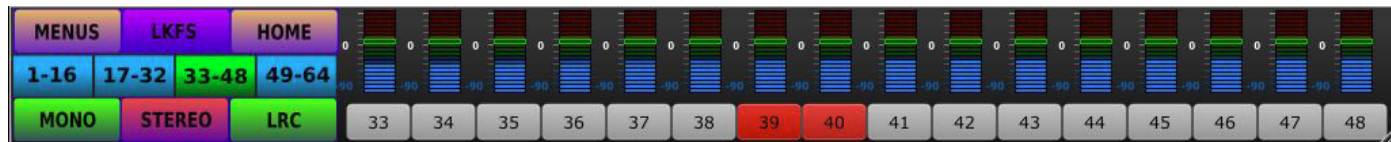
The AR-DM61-BT may be configured for 16, 32 or 64 channels of Dante audio. Ideally, this option should be ordered at the time of purchase. While Dante support may be added at a later date, the AR-DM61 may need to be returned to Marshall for component installation and programming.

The Dante option adds two additional RJ-45 Ethernet connectors on the back panel for Dante A&B networks. To listen to Dante audio, select **MENUS / DANTE**. All channel assignment and routing to the AR-DM61 are controlled via the **Dante Controller™** application available from Audinate®.

When Dante monitoring is selected, up to 64 channels may be presented on the front panel display. This is similar to the MADI display described above.



By selecting the **STEREO** button, groups of 16 channels may be displayed instead of 64 as shown in the example below.



## 9. Network Browser Control - Initial Setup

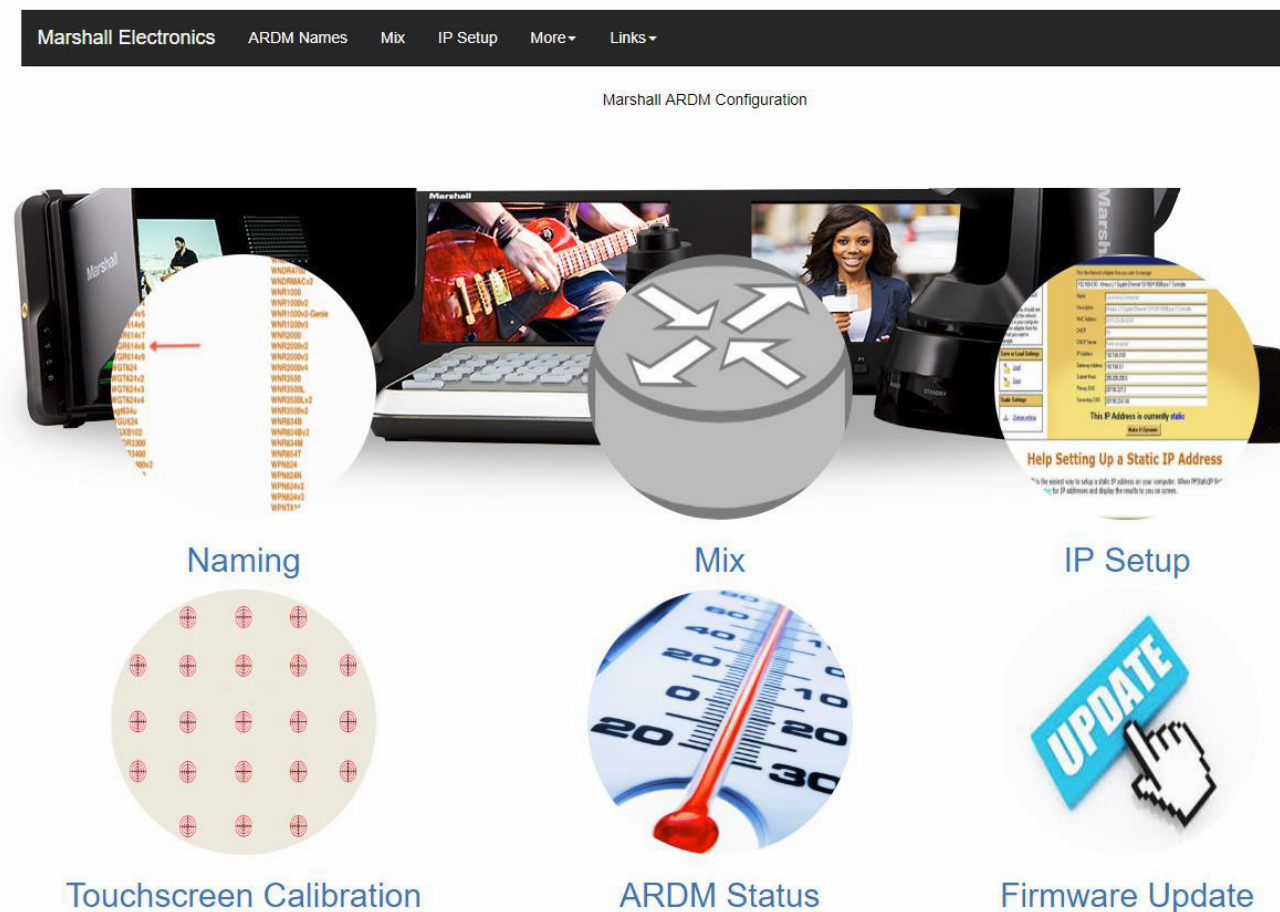
### Network control of the AR-DM61

Deep configuration of the AR-DM61 is available via Ethernet using a standard Internet browser. Any computer on the same network can access the unit.

First, locate the current IP address from the front panel of the AR-DM61 by pressing the **MENUS** button then the **IP Address** button. The current IP address will appear at the top of the screen.

Next, type this complete address as it appears including the port number “:5000” into a web browser and press Enter. (Example: 192.168.1.10:5000)

You should see a screen like this one.



**Note:** Windows 10 now limits Internet Explorer features. Some restrictions now apply in Safari as well. Please use Edge, Chrome or Firefox.



## Functions:

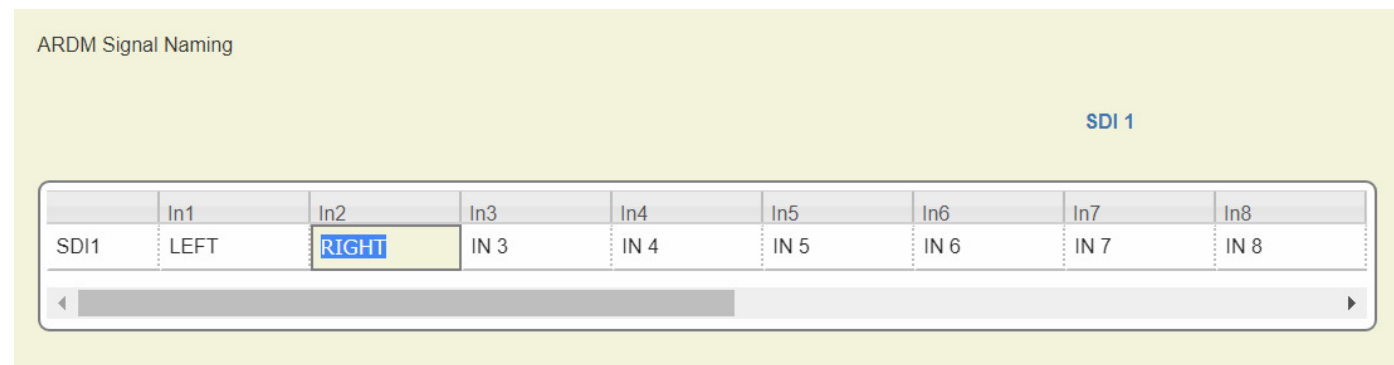
- **Naming** – Allows custom names for sources. For example: Change the default name “IN 1” to “STUDIO 1” or “SERVER 5”, etc.
- **Mix** – Create down-mixes that will take effect when MIX button on the AR-DM61 front panel is selected. Each input type can have it’s own custom mix.
- **IP Setup** – Setup network connection type, either DHCP mode or Fixed IP address
- **Touchscreen Calibration** – Initiate touchscreen calibration to align buttons with icons.
- **ARDM Status** – Shows current operating voltages and temperatures inside the AR-DM61
- **Firmware Update** – Allows updating software via Ethernet.

## 10. Network Control - Operations

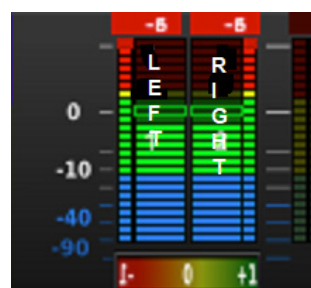
### NAMING

Click on **Naming** to see the screen below. Source names may be changed by simply highlighting (turns blue) the default name such as “IN 1” with the new name “LEFT”, click on an adjacent cell like IN 3 to complete the edit then click on the **Update ARDM** button. The message “**Update Successful**” will appear.

The new name will take effect after the front panel **HOME** button is pressed or a new input source is selected.



In this example, the meter names have been changed to “LEFT” and “RIGHT”.



**Tip:** Entire channel groups may be renamed at one time. Type the names into a spreadsheet row, highlight the names, select COPY. On the AR-DM61 page, highlight input #1 in a group and select PASTE. Up to 64 names may be pasted in one row. Likewise, existing channel names may be copied from the AR-DM61 and saved back to a spreadsheet for use later by reversing the process. Use all CAPS to improve readability.

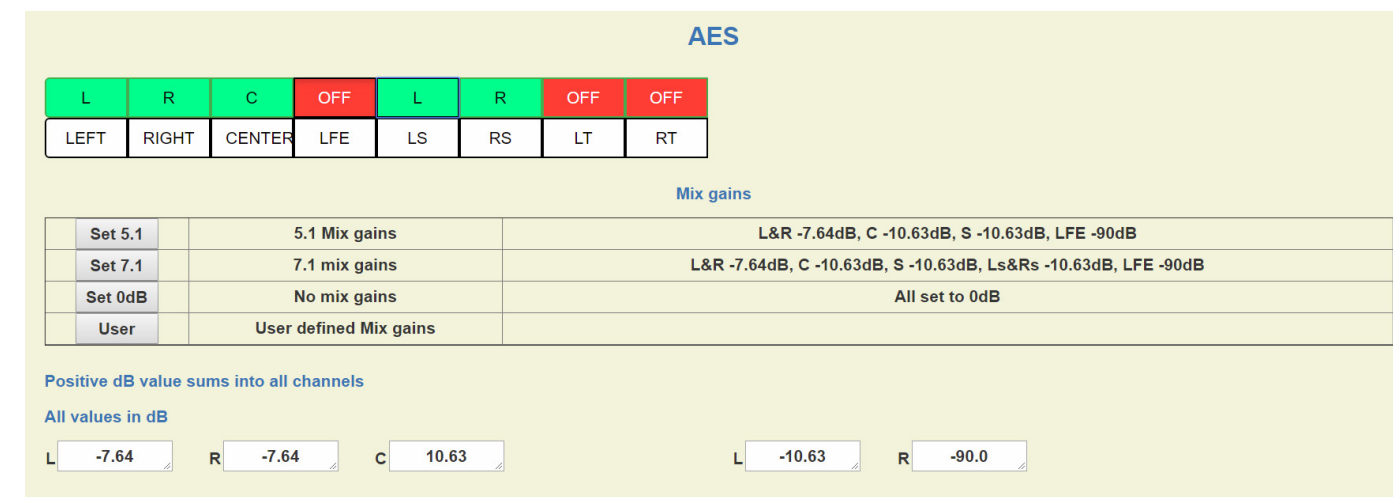
## MIX

Separate mixes are created for each input source. The MIX created on this page is heard ONLY when the **MIX** button on the front of the AR-DM61 is pressed. Channels that are included in the mix will be highlighted in Green and have the letter L, R or C. Channels that are not included will be highlighted in Red and say OFF.

Selecting “L” means the sound will come out of the AR-DM61 left speaker, “R” means the sound will come out of the right speaker and “C” means the sound will come out of both left and right speakers.

In the example below, the AES source has been setup for a 5.1 channel down-mix. Channels 4,7 and 8 have been turned OFF and the channel names have been edited.

**Note:** Downmixes may be fine-tuned by adjusting the gain values shown in the input fields at the bottom. Gains are shown as negative numbers to represent their relative strength in the mix. Setting a positive number will cause that input to appear on ALL output channels. A value of -90 = OFF. When a MIX is selected on the AR-DM61 front panel, it is also applied to the rear panel Analog output (8 channel group).



- **Add or remove channels** - Simply click on channel buttons to add or remove them from the mix. (Cycle through choices of: **L, R, C** or **OFF**).
- **Presets** - There are presets provided for common mixes. Click one of the Gray buttons on the left to select presets: **5.1, 7.1, All 0db** or **User**. Mix values are pre-established but can be “trimmed” by typing a new dB level below the chart. If a channel is OFF, there will be no mix value shown. Selecting L, R or C for that channel will open a new mix value window. A value of 0.0 is full level (no gain reduction). A value of -90.0 is equivalent to OFF.
- **Activate** - When the desired mix has been created, scroll to the bottom of the page and click on **Update ARDM** to send the changes to the AR-DM61 or click **Cancel** to discard the changes.

Update ARDM

Cancel

- Pressing the **HOME** button on the AR-DM61 front panel will update it. When the **MIX** button is next used, the new mix will be applied.
- Mix Shortcut – An entire group of 8 channels may be quickly set to a particular mix with just two mouse clicks. This is especially helpful when working with large numbers of channels as is common with MADI or Dante.

In the example below, MADI channel 17 was selected, then the “Set 7.1” button was clicked. The whole row is now set for 7.1 mixdown.

**MADI**

IN 1	L	IN 2	R	IN 3	C	IN 4	L	IN 5	R	IN 6	OFF	IN 7	OFF	IN 8	OFF
IN 9	L	IN 10	R	IN 11	C	IN 12	L	IN 13	R	IN 14	OFF	IN 15	OFF	IN 16	OFF
IN 17	L	IN 18	R	IN 19	C	IN 20	L	IN 21	R	IN 22	OFF	IN 23	OFF	IN 24	OFF
IN 25	L	IN 26	R	IN 27	C	IN 28	L	IN 29	R	IN 30	OFF	IN 31	OFF	IN 32	OFF
IN 33	L	IN 34	R	IN 35	C	IN 36	L	IN 37	R	IN 38	OFF	IN 39	OFF	IN 40	OFF
IN 41	L	IN 42	R	IN 43	C	IN 44	L	IN 45	R	IN 46	OFF	IN 47	OFF	IN 48	OFF
IN 49	L	IN 50	R	IN 51	C	IN 52	L	IN 53	R	IN 54	OFF	IN 55	OFF	IN 56	OFF
IN 57	L	IN 58	R	IN 59	C	IN 60	L	IN 61	R	IN 62	OFF	IN 63	OFF	IN 64	OFF

Mix gains

Set 5.1	5.1 Mix gains	L&R -7.64dB, C -10.63dB, S -10.63dB, LFE -90dB
Set 7.1	7.1 mix gains	L&R -7.64dB, C -10.63dB, S -10.63dB, Ls&Rs -10.63dB, LFE -90dB
Set 0dB	No mix gains	All set to 0dB
User	User defined Mix gains	

Positive dB value sums into all channels

All values in dB

L	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
L	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63
R	-7.64	R	-7.64	L	10.63	R	-10.63	L	-10.63

IP Setup

This page offers two choices depending on the “slide switch” at the bottom. When the switch is set to **DHCP**, you will see the image on the left. When it is set to **Fixed**, you will see the image on the right. In DHCP mode, the IP address will be assigned by a router or DHCP server on the network. In Fixed mode, IP address, Netmask and Gateway may be typed into the available fields to create a Fixed IP Address. Once you have changed the mode or altered the address, click on the **Update ARDM** button to transmit the change to the AR-DM61. This will cause the unit to restart (allow 30 seconds). **Note:** When the IP address has been changed, the browser cannot communicate with the AR-DM61 until the new address is typed into the browser address window since the old address will no longer work.

ARDM IP Settings

	IP
	Gateway
	Netmask

Set DHCP or Fixed IP

DHCP

Update ARDM

ARDM IP Settings

	IP
0.0.0.0	Gateway
255.255.255.0	Netmask

Set DHCP or Fixed IP

Fixed

Update ARDM

### Touchscreen Calibration

This function is rarely needed. When the AR-DM61 is mounted at an angle or in a hard-to-reach location relative to the operator, the buttons may appear to not match the location that is being touched. Using the Touchscreen Calibration process, the button graphic and the active screen location may be aligned. There are just two choices on this page:

- Start Calibration
- Use Default Calibration

When **Start Calibration** is selected, a small timer circle appears in the center of the front panel display and a “+” symbol appears in the upper left corner of the display. Tap on the “+” and a new “+” will appear in the upper right corner. Continue to tap on these symbols until all four corners of the screen have been touched. At this point, a message will appear on the web browser. **“Touch Screen Calibration Successful....Please Restart ARDM”**. Restarting the AR-DM61 will activate the new calibration.

To restart the unit, Select the **MENUS** button then select either **IP Setup** or **About** and press **System Reset**.



### ARDM Status

This page is used to monitor the AR-DM61 internal operating Voltages and Temperatures. Operating peak and average voltages and currents are displayed. Also software and FPGA firmware versions. This information is primarily useful for system test and troubleshooting.

#### ARDM Status

	Version	Date
Software	0.35	Wed 13 Jun 12:58:14 PDT 2018
FPGA		255.254
	Temperature(C)	Max Temp since Boot(C)
FPGA	57.19	57.56
CPU	63.38	66.07
Voltage(V)	Actual Voltage(V)	Current(A)
1.0	1.03	0.13
1.5	1.49	NA
1.8	1.79	NA
3.3	3.32	2.63
5.0	4.92	1.65
SDI 1	1920X1080P 59.94 48000	
SDI 2	1920X1080i 29.97 48000	



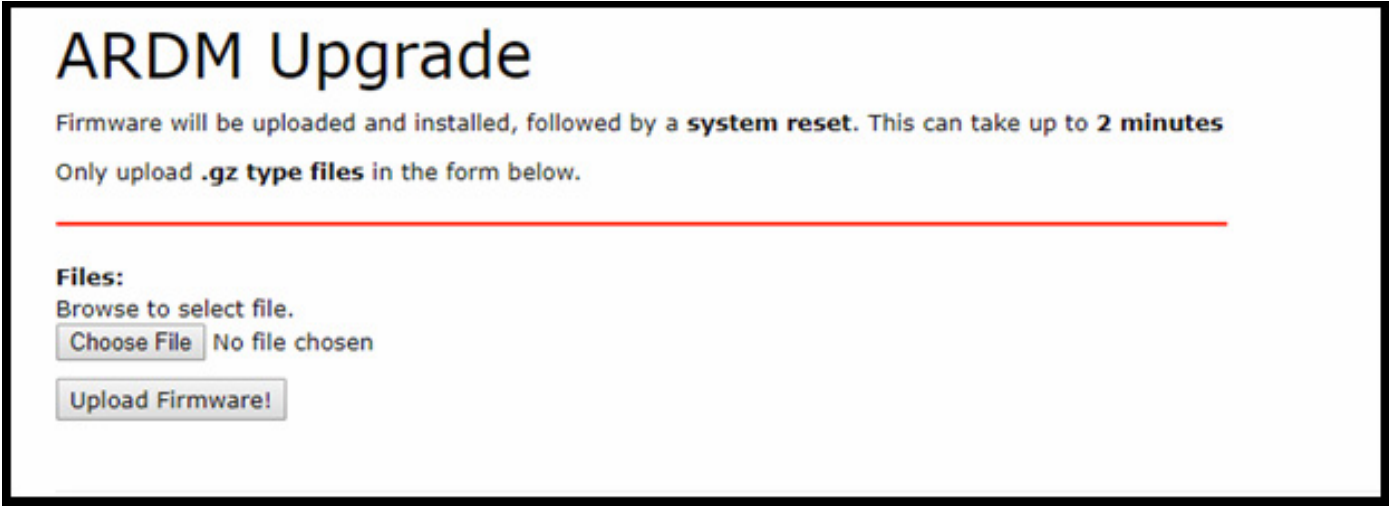
Firmware Upgrade

To upgrade the AR-DM61, first obtain an update file from the Marshall Electronics website here:

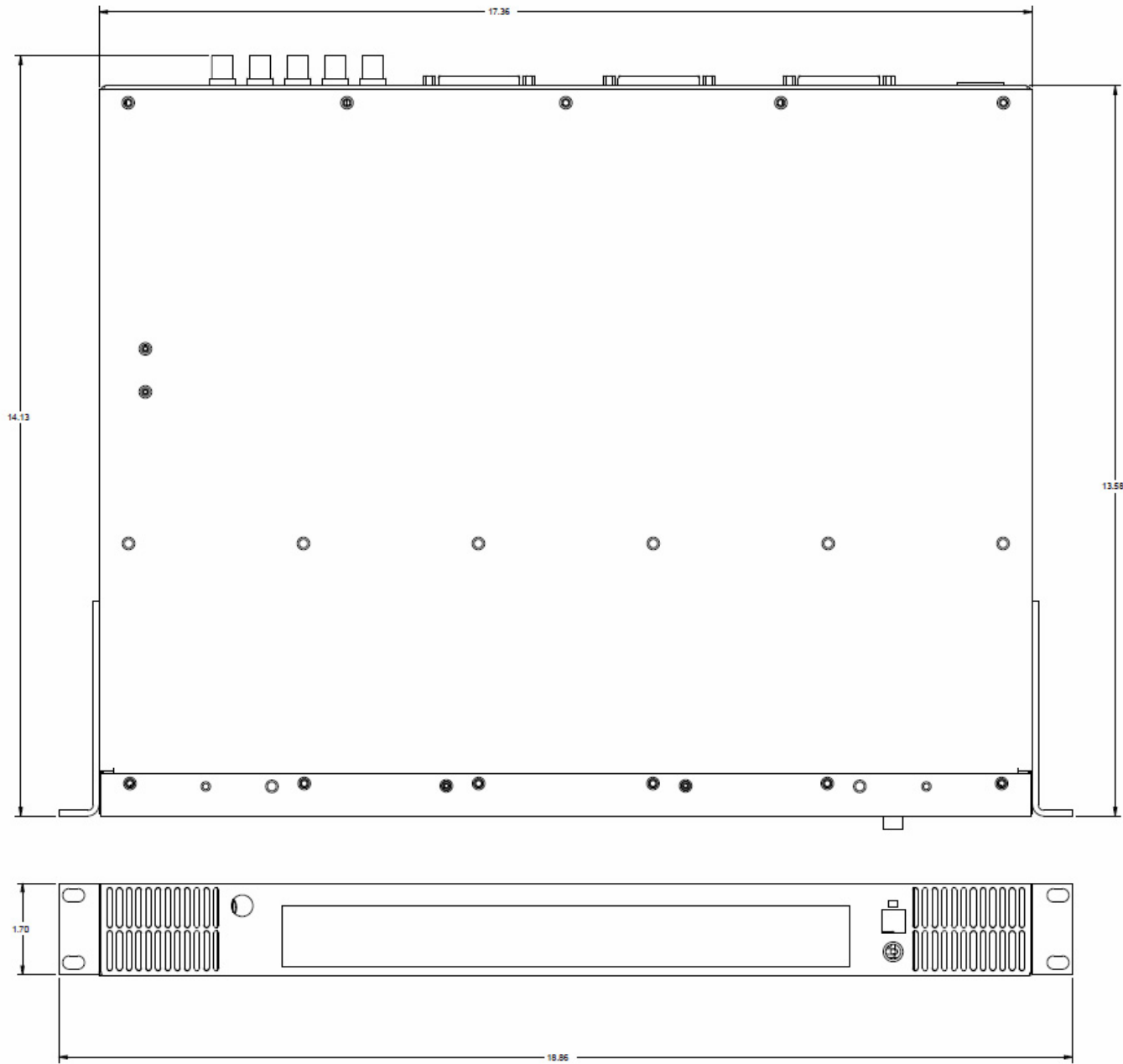
Update files are currently not posted on the website. Please contact your Marshall Electronics representative for the latest firmware.

Save this file to your computer then click on the Choose Files button (see below) and browse your computer for the update file and select it. The correct file will have the extension ".gz". Next, click on the Upload Firmware button. This will cause the AR-DM61 front panel to go blank and the upgrade process will begin.

After approximately 2 minutes, the unit will restart and the update process will be complete. The installed firmware version and build date can be confirmed by pressing the front panel MENU button then the About button.



11. Dimensions



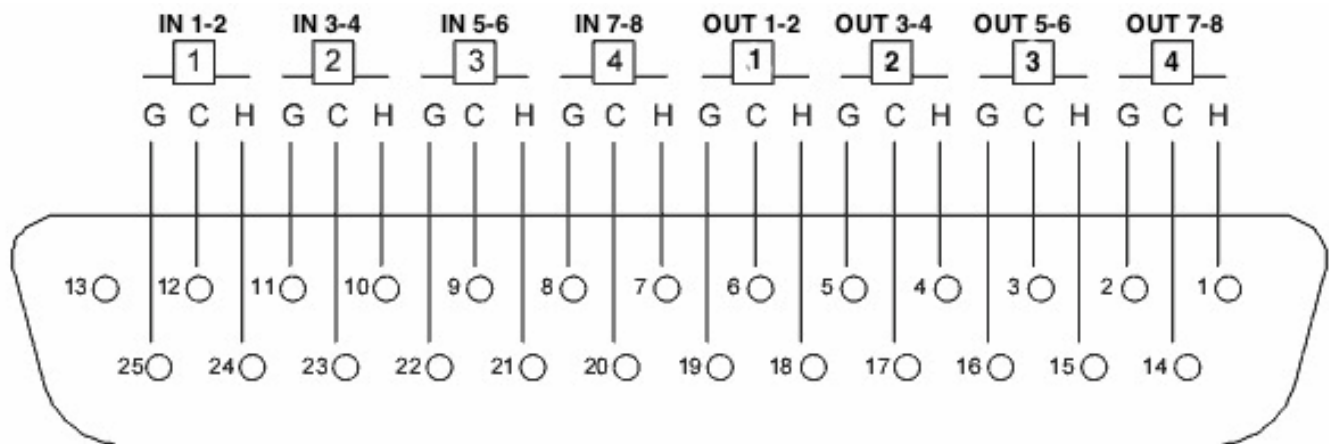
**12. Specifications**

Model Name	AR-DM61
<b>Technical</b>	
Video Input Connections	2 x 3G SDI with looping output
Video Formats Supported	SDI up to 1080p50, 59.94,60
Audio Input Connections	SDI Embedded 16 channels (two inputs) Analog 8 channels balanced via 25-pin DSub (Tascam format) AES 8 channels digital via 25-pin DSub (Tascam format) Dante up to 64 channels via dual IP (option board) MADI 64 channels (auto selected if present on either SDI input)
Audio Output Connections	AES/EBU 8 channels via 25-pin DSub (Tascam format) Analog 8 channels balanced via 25-pin DSub (Tascam format)
USB 2.0 Port	Product Test / Service
Network Connections	Ethernet 100 Base-T, supports DHCP or Fixed Addressing Dual 1GB Ethernet (included with Dante Option)
Dante Network Connection	Dual 1Gigabit Ethernet. Supports Dual A/B Network Operation

<b>Mechanical &amp; Electrical</b>	
Housing	Metal enclosure
Dimensions [H x W x D]	1.75" X 17.36" x 14.3" / 4.45 cm x 44.0 cm x 36.3 cm
Weight	8.8 lbs / 4 Kg
Mounting	Integral "ears" for standard 19" rack mount
Included Power supply	DC 24-Volts 6.25 Amps 4-pin XLR connector
DC Power consumption	20 Watts Typical
Operation temperature	0~40°C [32~104°F]
Storage temperature	-20~60°C [-4~140°F]
ESD protection	Human body model — ±15kV [air-gap discharge] & ±8kV [contact discharge]
Relative humidity	20~90% RH [no condensation]

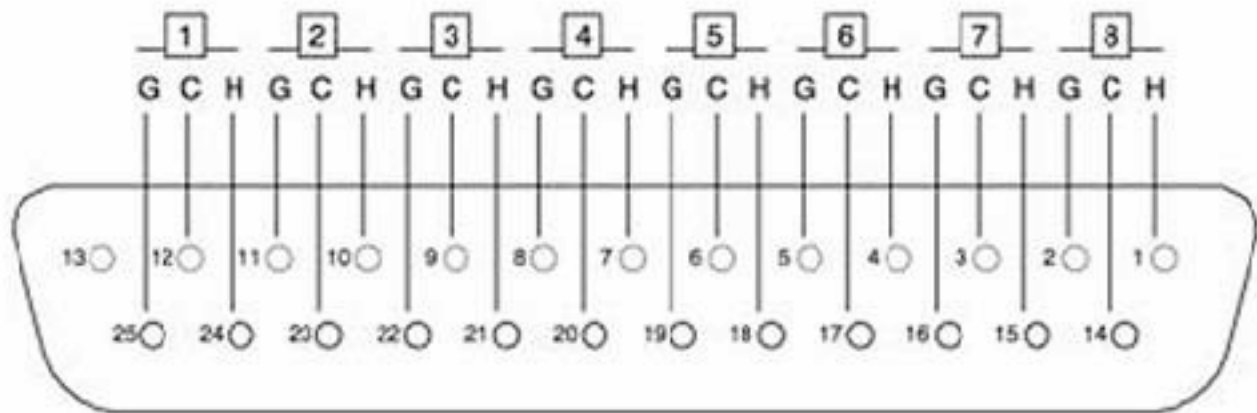
**13. Connector Details**

**AES/EBU Input / Output Connector**



H = HOT  
C = COLD  
G = GROUND

**Analog Balanced Input and Output Connectors**



H = HOT  
C = COLD  
G = GROUND

Connections are Tascam® format and compatible with Mogami breakout cable model: **Gold DB25-XLRM** available in various lengths from Marshall Electronics. See link below for details:  
[http://www.mogamicable.com/category/products/gold-AES\\_TD\\_DB25-XLR.php](http://www.mogamicable.com/category/products/gold-AES_TD_DB25-XLR.php)

## Warranty

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Marshall Electronics warrants to the first consumer that this device will, under normal use, be free from defects in workmanship and materials, when received in its original container, for a period of two years from the purchase date. This warranty is extended to the first consumer only, and proof of purchase is necessary to honor the warranty. If there is no proof of purchase provided with a warranty claim, Marshall Electronics reserves the right not to honor the warranty set forth above. Therefore, labor and parts may be charged to the consumer. This warranty does not apply to the product exterior or cosmetics. Misuse, abnormal handling, alterations or modifications in design or construction void this warranty. No sales personnel of the seller or any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties on behalf of Marshall Electronics, beyond the time period described above.

Due to constant effort to improve products and product features, specifications may change without notice.

# Marshall

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