A3-OPT 2, A3-OPT 3, A3-OPT 5, A3-4004, and A3-OPT 3/5 TL

TVM/VTM Audio Options

Installation and Operation Handbook

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Operator's Safety Summary

WARNING: These instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

Important Safety Instructions

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade (or the third prong)is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The device's IEC power connector shall remain readily accessible.

Ensuring Safety

- The unit should not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the unit.
- When the unit is to be permanently cabled, connect the protective ground conductor before making any other connections.
- Operate built-in units only when they are properly fitted into the system.
- For permanently cabled units without built-in fuses, automatic switches, or similar protective facilities, the AC supply line must be fitted with fuses rated to the units.
- Before switching on the unit, ensure that the operating voltage set at the unit matches the line voltage, if appropriate. If a different operating voltage is to be set, use a fuse with the appropriate rating. Refer to the Installation Instructions.
- Units of Protection Class I with an AC supply cable and plug that can be disconnected must be operated only from a power socket with protective ground contact:
    - Do not use an extension cable— it can render the protective ground connection ineffective.
    - Do not intentionally interrupt the protective ground conductor.
    - Do not break the protective ground conductor inside or outside the unit or loosen the protective ground connection; such actions can cause the unit to become electrically hazardous.
- Before opening the unit, isolate it from the AC supply. Then ensure that:
    - Adjustments, part replacements, maintenance, and repairs are carried out by qualified personnel only.
    - Safety regulations and rules are observed to prevent accidents.
    - Only original parts are used to replace parts relevant to safety (for example, the power on/off switches, power transformers, and fuses).
- Replaceable fuses can be hazardous when live. Before replacing a fuse, disconnect the AC power source.
- Use caution when cleaning the equipment; isopropyl alcohol or similar solvents can damage or remove the labels.
- Observe any additional safety instructions specified in this manual.

Explanation of Symbols

Read the *Operator's Handbook* or the *Service and Instruction Manual* and observe the safety symbols used.

Caution: shock hazard

Protective ground connection

Caution: shock hazard

Unit ground

Equipotentiality

Ground

Direct Current

Certification Labels and Symbol Locations

On Harris equipment, certification labels and symbols are located on the back panel, rear chassis sides, or bottom rear of the chassis. On smaller space-restricted units, most labels and symbols can be found on the bottom rear of the chassis.

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Directive and Compliances

This section provides information concerning Harris Corporation compliance with EU Directive 2002/95/EC and EU Directive 2002/96/EC.

Restriction on Hazardous Substances (RoHS) Directive 2002/95/EC

Directive 2002/95/EC—commonly known as the European Union (EU) Restriction on Hazardous Substances (RoHS)—sets limits on the use of certain substances found in electrical and electronic equipment. The intent of this legislation is to reduce the amount of hazardous chemicals that may leach out of landfill sites or otherwise contaminate the environment during end-of-life recycling. The Directive, which took effect on July 1, 2006, refers to the following hazardous substances:

Lead (Pb)
Mercury (Hg)
Cadmium (Cd)
Hexavalent Chromium (Cr-V1)
Polybrominated Biphenyls (PBB)
Polybrominated Diphenyl Ethers (PBDE)

In accordance with this EU Directive, all Harris products sold in the European Union will be fully RoHS-compliant and "lead-free." (See the Harris Premier website for more information on dates and deadlines for compliance.) Spare parts supplied for the repair and upgrade of equipment sold before July 1, 2006 are exempt from the legislation. Harris equipment that complies with the EU directive will be marked with a RoHS-compliant symbol, as shown in Figure 1.

Figure 1. RoHS Compliance Symbol

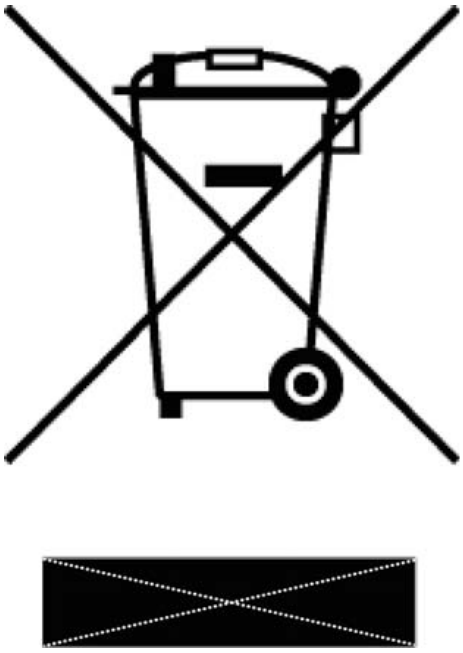
Waste from Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

The European Union (EU) Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE) deals with the collection, treatment, recovery, and recycling of electrical and electronic waste products. The objective of the WEEE Directive is to assign the responsibility for the disposal of associated hazardous waste to either the producers or users of these products. As of August 13, 2005, producers or users are required to recycle electrical and electronic equipment at end of its useful life, and must not dispose of the equipment in landfills or by using other unapproved methods. (Some EU member states may have different deadlines.)

In accordance with this EU Directive, Harris Corporation and other companies selling electric or electronic devices in the EU will affix labels indicating that such products must be properly recycled.

(See the Harris Premier website for more information on dates and deadlines for compliance.) Contact your local Harris sales representative for information on returning these products for recycling. Harris equipment that complies with the EU directive will be marked with a WEEE-compliant symbol, as shown in **Figure 2**.

Figure 2. WEEE Compliance Symbol



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Section 1 ♦ Introduction

The Videotek multi-format VTM and TVM units are the most advanced, versatile, and intuitive 3G/HD/SD-SDI monitoring instruments available today. With 100% digital signal processing technology, they provide an accurate and stable user customizable display of multiple Waveform, Vector, Gamut, Audio, Picture, Relative Timing, Dual Link, Alarm Status, and Data Analyzer functions in quadrant or full-screen views.

*US Patents 6,069,607, 6,532,024, and 6,828,981. UK Patent 2,330,475. Other US and foreign patents pending.

Overview

TVM/VTM A3-OPT 2 Advanced Audio Analysis Option provides the following features:

- Bargraphs and CineSound®.
- Lissajous pattern displayed with two or four channels
- View up to eight channels.
- Includes four analog stereo inputs, four AES/EBU inputs with four shared outputs and 16 channels of embedded audio
- Analog monitoring outputs of up to eight channels simultaneously
- Can be enhanced using the A3-OPT 4004 Audio Expansion module.

TVM/VTM A3-OPT 3 Advanced Audio Analysis Option provides the following features: View up to eight channels.

- Bargraphs and CineSound®.
- Lissajous pattern displayed with two or four channels
- Includes four analog stereo inputs, and eight AES/EBU inputs with four shared outputs and 16 channels of embedded audio
- Analog monitor outputs of up to eight channels simultaneously
- Customizable meter labels

TVM/VTM A3-OPT 5 Advanced Audio Analysis Option provides the following features:

- View up to eight channels.
- Full Dolby decoding with up to eight analog outputs
- Dolby decoding to mix down analog output
- Bargraphs and CineSound®.
- Lissajous pattern displayed with two or four channels
- Includes four analog stereo inputs, and eight AES/EBU inputs with four shared outputs and 16 channels of embedded audio
- Analog monitor outputs of up to eight channels simultaneously

- Dolby metadata display
- Customizable meter labels

TVM/VTM A3-4004 Audio expansion module provides the following features to combine with A3-OPT 2:

- Adds four AES/EBU input pairs to TVM/VTM A3-OPT 2

TVM/VTM A3-OPT 3 TL – Advanced Audio Analysis Option that provides the following features:

- Bargraphs and CineSound®.
- 5x oversampling for enhanced True Peak detection
- Lissajous pattern displayed with two or four channels
- Includes four analog stereo inputs, and eight AES/EBU inputs with four shared outputs and 16 channels of embedded audio
- Analog monitor outputs of up to eight channels simultaneously
- ITU-R BS.1770 loudness monitoring with bargraphs, trend chart, and numeric readout in accordance with EBU R 128 and ATSC A/85 recommendations.
- Customizable meter labels

TVM/VTM A3-OPT 5 TL – Advanced Audio Analysis Option provides the following features:

- Full Dolby decoding with up to eight analog outputs
- Dolby decoding to mix down analog output
- Bargraphs and CineSound®
- 5x oversampling for enhanced True Peak detection
- Lissajous pattern displayed with two or four channels
- Includes four analog stereo inputs, and eight AES/EBU inputs with four shared outputs and 16 channels of embedded audio
- Analog monitor outputs of up to eight channels simultaneously
- ITU-R BS.1770 loudness monitoring with bargraphs, trend chart, and numeric readout in accordance with EBU R 128 and ATSC A/85 recommendations.
- Selection of an AES or embedded pair for the AUX meters is available in an eight-channel display
- Dolby output is selectable from any 1 of the 8 pairs of the assigned input type (AES or Embedded)
- Dolby metadata display
- Customizable meter labels

VTM/VTM OPT V2A - Adds Lip Sync timing measurement and display to the TVM/VTM A3-OPT 3 TL and TVM/VTM A3- OPT 5 TL.

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Section 2 ♦ Installation

Upgrading the Option

The steps required to upgrade for A3-OPT 3, A3-OPT 5, and A3-4004 are:

1. Flash-update the unit firmware using the provided .flu file. Refer to Flash from USB for Flash instructions.
2. Remove the power from the TVM/VTM instrument.
3. Remove the cover to the TVM/VTM instrument.
4. Remove any A3 Option board (if required). Refer to the TVM/VTM removal instructions provided with new A3 Option shipment.
5. Install the new Option board. Refer to the A3 Option field upgrade instructions provided with the A3 Option shipment.
6. Fasten the cover onto the TVM/VTM instrument.
7. Re-apply power.

Flash from USB

NOTE: Ensure that the presets are saved before flashing.

The FLASH FROM USB menu is used in coordination with a USB memory stick to update the unit. Attach the USB stick into the back of the unit. Access the SYSTEM\FLASH UPDATE FROM USB\PRESENT. The unit then proceeds into flash mode. Flash update status is shown with the line-by-line programming and sector results. When complete, Flash Update Complete appears on the screen. Cycle the power to continue normal operation.

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Section 3 ♦ Operation

Audio Displays

Press the AUDIO button to display the audio display. The TVM/VTM accepts up to 8 AES/EBU, analog, and embedded inputs, and provides up to 8 analog output channels. Dolby D and Dolby E inputs are also available on selected options.

Five audio types are selected by pressing the SETUP button and selecting AUDIO SETUP\CONFIGURE INPUT A to D\AUDIO TYPE menu:

- **ANALOG**
- **AES/EBU** - A digital audio standard established jointly by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU).
- **EMBEDDED** - Digital audio information multiplexed onto a serial digital data stream. Up to sixteen channels can be multiplexed on a single stream of SDI video, minimizing cabling and routing requirement.
- **DOLBY AES** - Dolby encoded audio information from a digital audio input. (Dolby option required).
- **DOLBY EMB. (EMBEDDED)** - Dolby Encoded audio information multiplexed onto a serial digital data stream. (Dolby option required)

Configure the audio display type and parameters using the Audio Setup CONFIGURE INPUT A to D submenu. Audio can be displayed as:

- One 2 channel bar graph with 1 Lissajous and 1 Phase bar
- Two 2 channel bar graphs (for a total of 4 channels) with 2 Lissajous and 2 Phase bars
- Three 2 channel bar graphs (for a total of 6 channels) with 3 Phase bars or CineSound 5.1 with 2 Phase bars
- Four 2 channel bar graphs (for a total of 8 channels) with 4 Phase bars or CineSound 5.1+AUX, 6.1, or 7.1 with up to three phase bars.
- Loudness displays only when loudness option is installed. One display shows bars with trending chart; the other shows loudness readout in a numeric format.

Lissajous can be selected as Soundstage or X-Y displays.

Input assignments, scaling, input levels, and response can also be modified using the Audio Setup menu. The function of the audio is dependent upon the audio option installed.

Audio Scales

The Vertical audio graticule scales change according to the scale selections made in the AUDIO SETUP\METER SETUP\ANALOG or DIGITAL SCALE menu and the format being displayed.

The Scales are:

- TYPE I
- Type IIA
- Type IIB
- Type I + 8
- Nordic
- DIN 45406
- DBFS (Digital only)
- Zero Ref dBFS (ref –20 dBFS) (Digital only)
- Custom dBFS (Digital only)
- Custom dB

Vertical Bar Displays

The Vertical Meter displays the level, reference, and ballistics detail in a vertical format. There are eight analog audio input channels (four stereo pairs), 8 AES/EBU digital input channels (eight stereo pairs), and 16 embedded audio channels (serial-digital video input only) available for selection in the menu. A maximum of eight channels display simultaneously. Audio input channels can be assigned to any meter on the display.

The displayed inputs can also be monitored as analog signals on the 37-pin, D-Sub, ANALOG IN/OUT connector. The displayed AES/EBU or embedded audio is converted to analog audio for the monitoring output. The output audio level can be adjusted from -50 dB to +6 dB around the reference-input level. The default output level for a -20 dBFs input produces a +4 dBm analog output level (600Ω). For example, when applying a gain adjustment of +6 dB to the output with a -20 dBFs input signal, the audio output level will be +10 dBm into a 600Ω termination. This Audio Output Level adjustment is made in the AUDIO SETUP\OUTPUT PREFERENCES menu. The Audio Output Level adjustment default is 0 dB.

The phase bars are used to monitor the instantaneous phase relationship between two channels of audio. The “+” marking indicates a phase difference of 0 degrees, and the “-” marking indicates a phase difference of 180°. A properly phased stereo pair produces a phase pointer that moves within the green zone, whereas a reversed channel produces a pointer that moves within the red zone. The phase bar polarity in the AUDIO SETUP\METER SETUP\CONFIGURE PHASE BARS\POLARITY menu can be set to Normal or Reverse.

The effect of higher damping in a phase meter is to show an averaged rather than a peak value of phase. The Phase Bar Damping in the AUDIO SETUP\METER SETUP\CONFIGURE PHASE BARS\DAMPING can be set from FAST, 1 to 10, and SLOW.

The lissajous display appears for 2 and 4 bar graphs on the right of the audio pane. The lissajous display shows the amplitude and phase relationship between two input signals.

Vertical Audio display diagrams are shown in **Figure 3-1** to **Figure 3-4** and described in **Table 3-1** to **Table 3-4**. The Vertical audio graticule scales change according to the scale selections made in the Setup menu and the format being displayed. Some of the markings in the illustrations do not appear on the display.

Figure 3-1. Two Bar Graph Display with Lissajous Diagram

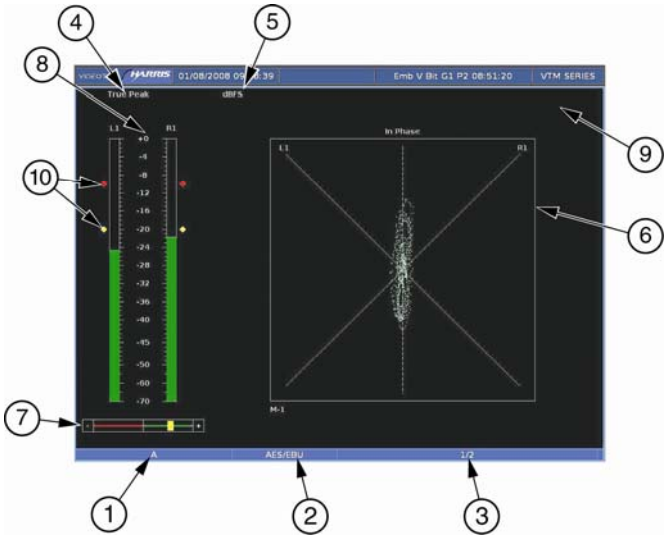


Table 3-1. Description of Two Bar Graph Display with Lissajous Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channel	The displayed information is option dependent. Shown as 1 to 16 (analog is 1 to 8, AES is 1 to 16 or 1 to 8, and Embedded is 1 to 16).
4	Meter Response	Displays the selected meter response: VU, Peak, True Peak, VU + Peak, VU + True Peak, Loudness, Custom
5	Scale Selection	Displays the selected meter scale: Type I, Type IIa, Type IIb, Type I + 8, Nordic, DIN 45406, dBFS, Zero REF dBFs, Custom dB, and Custom dBFS (scales are dependent upon audio type).
6	Lissajous Display	Lissajous of bar graph 1 with labels for R, L, and the number of the meter being monitored (i.e. M-1)
7	Phase Bar	Phase Meter of bar graph 1
8	Audio Graticule (with meter labels)	Shown as Stereo Pairs (L1, R1), SMPTE 320M, or Custom label.
9	Zoom	▪ Zoom (when enabled) ▪ Blank when disabled ▪ Press the ZOOM button to cycle through the Zoom modes
10	Level Markers	Shows the peak and reference levels for the signal. This can be adjusted in the AUDIO SETUP\METER SETUP\REF DIGITAL (or ANALOG) menu.

Figure 3-2. Four Bar Graph with Lissajous Display Diagram

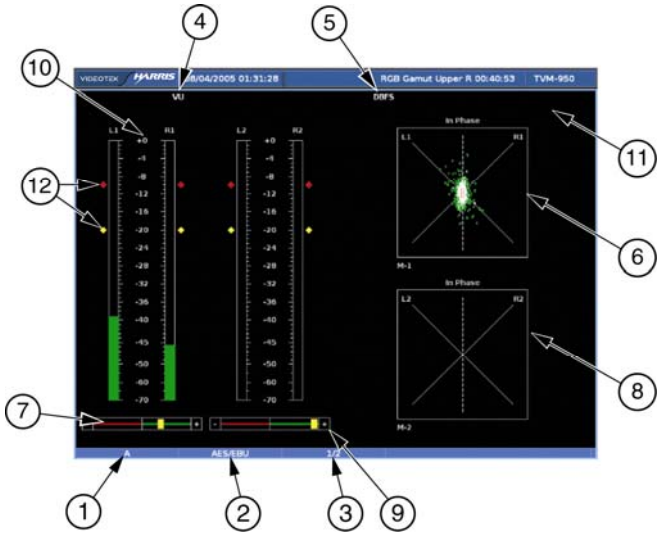


Table 3-2. Description of Four Bar Graph with Lissajous Display Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channel	The displayed information is option dependent. Shown as 1 to 16 (analog is 1 to 8, AES is 1 to 16 or 1 to 8, and Embedded is 1 to 16).
4	Meter Response	Displays the selected meter response: VU, Peak, True Peak, VU + Peak, VU + True Peak, Loudness, Custom
5	Scale Selection	Displays the selected meter scale: Type I, Type IIa, Type IIb, Type I + 8, Nordic, DIN 45406, dBFS, Zero REF dBFS (scales dependent upon audio type).
6	Lissajous Display (1)	Lissajous of bar graph 1 with labels for R, L, and the number of the meter being monitored (i.e. M-1)
7	Phase Bar (1)	Phase Meter of bar graph 1
8	Lissajous Display (2)	Lissajous of bar graph 1 with labels for R, L, and the number of the meter being monitored (i.e. M-2)
9	Phase Bar (2)	Phase Meter of bar graph 2
10	Audio Graticule (with meter labels)	Shown as L1, R1, L2, and R2 (or Custom label).
11	Zoom	▪ Zoom (when enabled) ▪ Blank when disabled ▪ Press the ZOOM button to cycle through the Zoom modes
12	Level Markers	Shows the peak and reference levels for the signal. This can be adjusted in the AUDIO SETUP\METER SETUP\REF DIGITAL (or ANALOG) menu.

Figure 3-3. Six Bar Graph with Lissajous Display Diagram

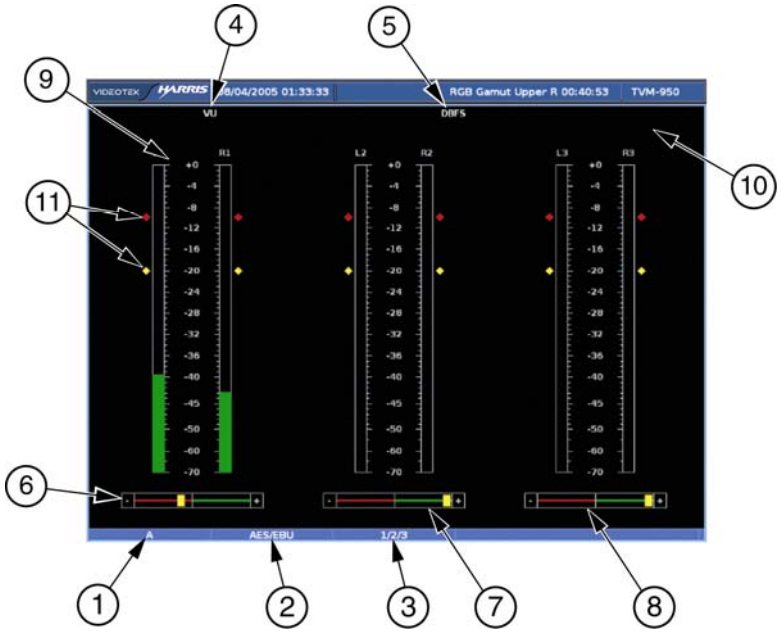


Table 3-3. Description of Six Bar Graph with Lissajous Display Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channel	The displayed information is option dependent. Shown as 1 to 16 (analog is 1 to 8, AES is 1 to 16 or 1 to 8, and Embedded is 1 to 16).
4	Meter Response	Displays the selected meter response: VU, Peak, True Peak, VU + Peak, VU + True Peak, Custom, Loudness
5	Scale Selection	Displays the selected meter scale: Type I, Type IIa, Type IIb, Type I + 8, Nordic, DIN 45406, dBFS, Zero REF dBFs.
6	Phase Bar (1)	Phase Meter of bar graph 1
7	Phase Bar (2)	Phase Meter of bar graph 2
8	Phase Bar (3)	Phase Meter of bar graph 3
9	Audio Graticule (with meter labels)	Shown as L1, R1, L2, R2, L3, and R3 (or Custom label).
10	Zoom	▪ Zoom (when enabled) ▪ Blank when disabled ▪ Press the ZOOM button to cycle through the Zoom modes
11	Level Markers	Shows the peak and reference levels for the signal. This can be adjusted in the AUDIO SETUP\METER SETUP\REF DIGITAL (or ANALOG) menu.

Figure 3-4. Eight Bar Graph Display Diagram

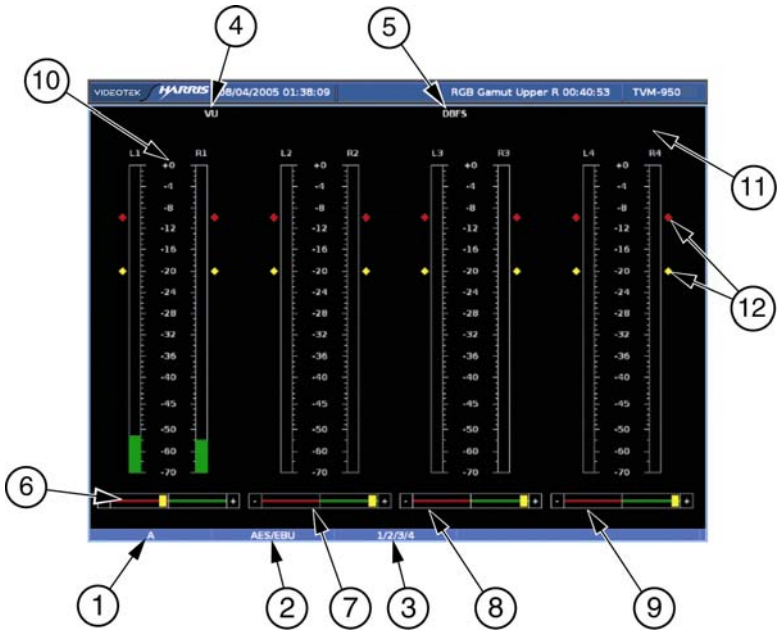


Table 3-4. Description of Eight Bar Graph Display Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channel	The displayed information is option dependent. Shown as 1 to 16 (analog is 1 to 8, AES is 1 to 16 or 1 to 8, and Embedded is 1 to 16).
4	Meter Response	Displays the selected meter response: VU, Peak, True Peak, VU + Peak, VU + True Peak, Loudness, Custom
5	Scale Selection	Displays the selected meter scale: Type I, Type IIa, Type IIb, Type I + 8, Nordic, DIN 45406, dBFS, Zero REF dBFs.
6	Phase Bar (1)	Phase Meter of bar graph 1
7	Phase Bar (2)	Phase Meter of bar graph 2
8	Phase Bar (3)	Phase Meter of bar graph 3
9	Phase Bar (4)	Phase Meter of bar graph 4
10	Audio Graticule (with meter labels)	Shown as L1, R1, L2, R2, L3, and R3 (or Custom label).
11	Zoom	▪ Zoom (when enabled) ▪ Blank when disabled ▪ Press the ZOOM button to cycle through the Zoom modes
12	Level Meters	Shows the peak and reference levels for the signal. This can be adjusted in the AUDIO SETUP\METER SETUP\REF DIGITAL (or ANALOG) menu.

CineSound Displays

This unique, audio display provides an intuitive view of 5.1, 6.1, and 7.1 channels of surround sound audio. The default meter movement is from the center outward, but it can be reversed by a selection in the AUDIO SETUP menu. Two additional channels of audio can be viewed next to the CineSound® display, if required, thereby providing a total of eight channels on the screen. When the CineSound® display is selected, the audio inputs and meter labels follow a SMPTE ST 2035:2009 Case 11c mapping scheme. The 5.1 mapping scheme is listed in **Table 3-5**.

Table 3-5. CineSound® 5.1 Audio Input Mapping

Analog Input	AES/EBU Input	CineSound Display Assignment	8-Bar Display Assignment
1	**1**	Left	1 Left (L1)
2	**1**	Right	1 Right (R1)
3	**2**	Center	2 Left (L2)
4	**2**	Low Frequency Effects (LFE)	2 Right (R2)
5	**3**	Left Surround (LS)	3 Left (L3)
6	**3**	Right Surround (RS)	3 Right (R3)
7	**4**	Left Aux	4 Left (L4)
8	**4**	Right Aux	4 Right (R4)

The 5.1 CineSound Audio display diagram is illustrated in **Figure 3-5** and described in **Table 3-6**. **Figure 3-6** displays CineSound with 6.1 Channels. **Figure 3-7** displays CineSound with 7.1 Channels.

Figure 3-5. CineSound 5.1 Display Diagram

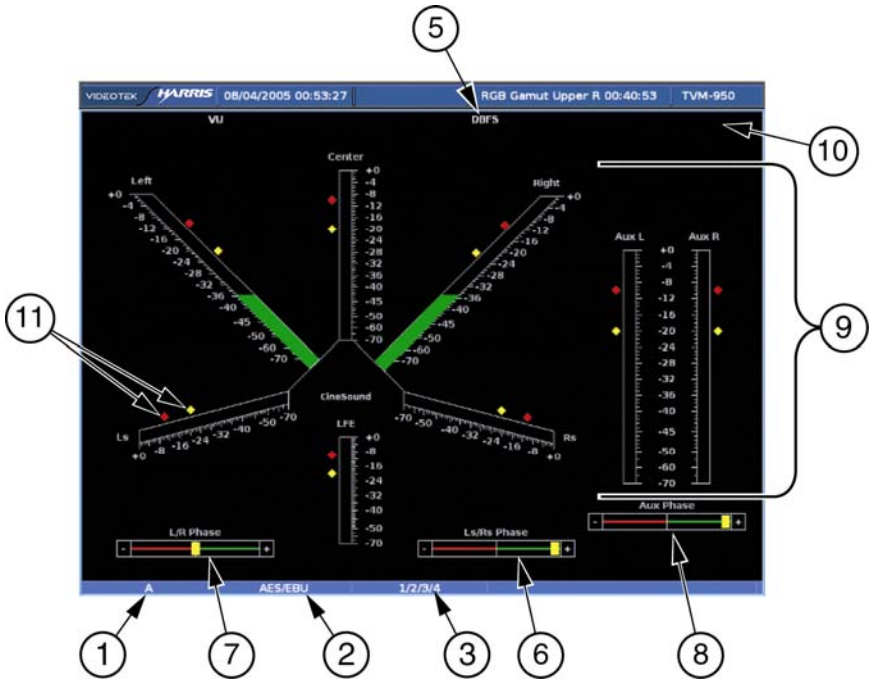


Table 3-6. Description of CineSound Display Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channel	The displayed information is option dependent. Shown as 1 to 16 (analog is 1 to 8, AES is 1 to 16 or 1 to 8, and Embedded is 1 to 16).
4	Meter Response	Displays the selected meter response: VU (normal), Peak, True Peak, VU + Peak, VU + True Peak, Loudness, Custom
5	Scale Selection	Displays the selected meter scale: Type I, Type IIa, Type IIb, Type I + 8, Nordic, DIN 45406, dBFS, Zero REF dBFs.
6	Phase Meter of Surround LR	Displays the Surround LR Phase
7	Phase Meter of Front LR	Displays the Front LR Phase
8	Phase Meter of AUX	Displays the AUX Phase
9	Audio Graticule (with meter labels)	Shown as LFE, Ls, Left, Center, Right, Rs, and AUX L, R (or Custom label). These are the default labels.
10	Zoom	▪ Zoom (when enabled) ▪ Blank when disabled ▪ Press the ZOOM button to cycle through the Zoom modes
11	Level Meters	Shows the peak and reference levels for the signal. This can be in the AUDIO SETUP\METER SETUP\REF DIGITAL (or ANALOG) menu.

Figure 3-6. CineSound 6.1 Channels Display

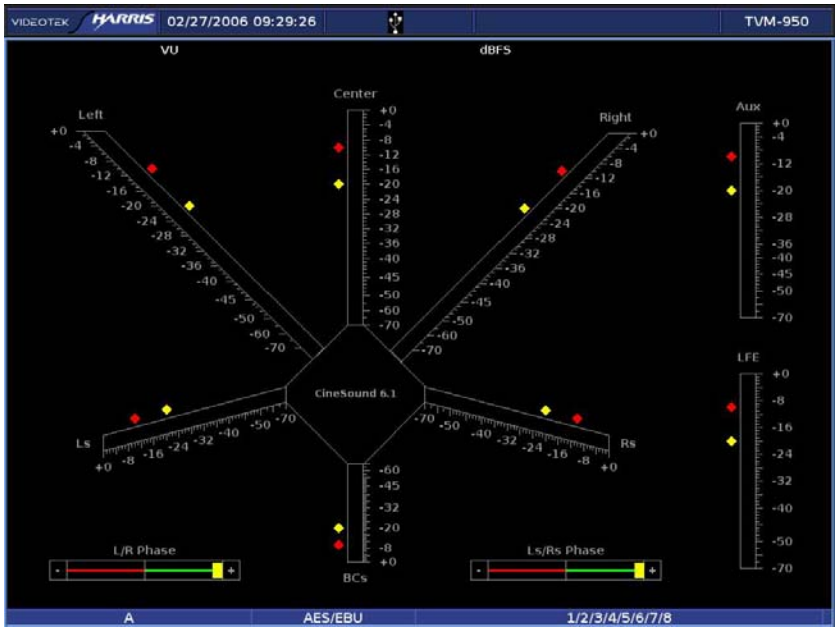
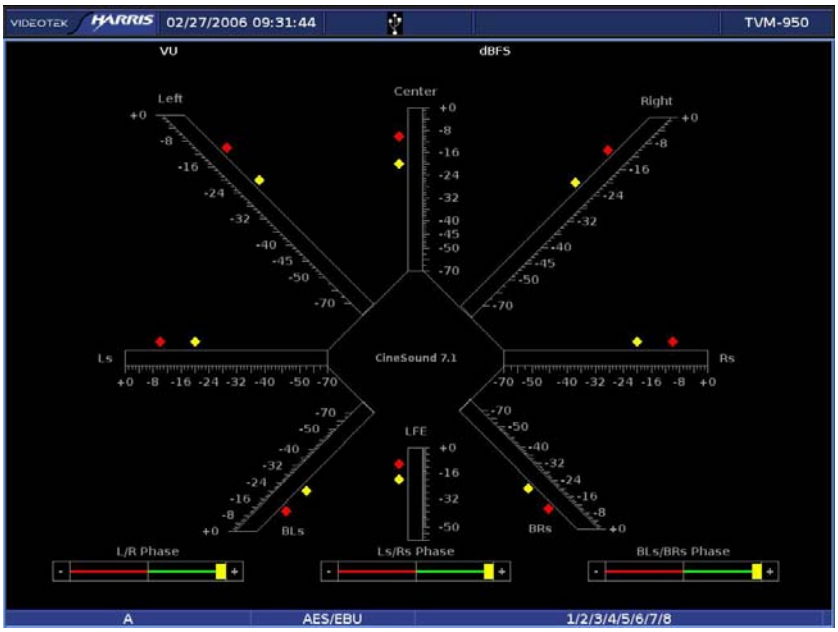


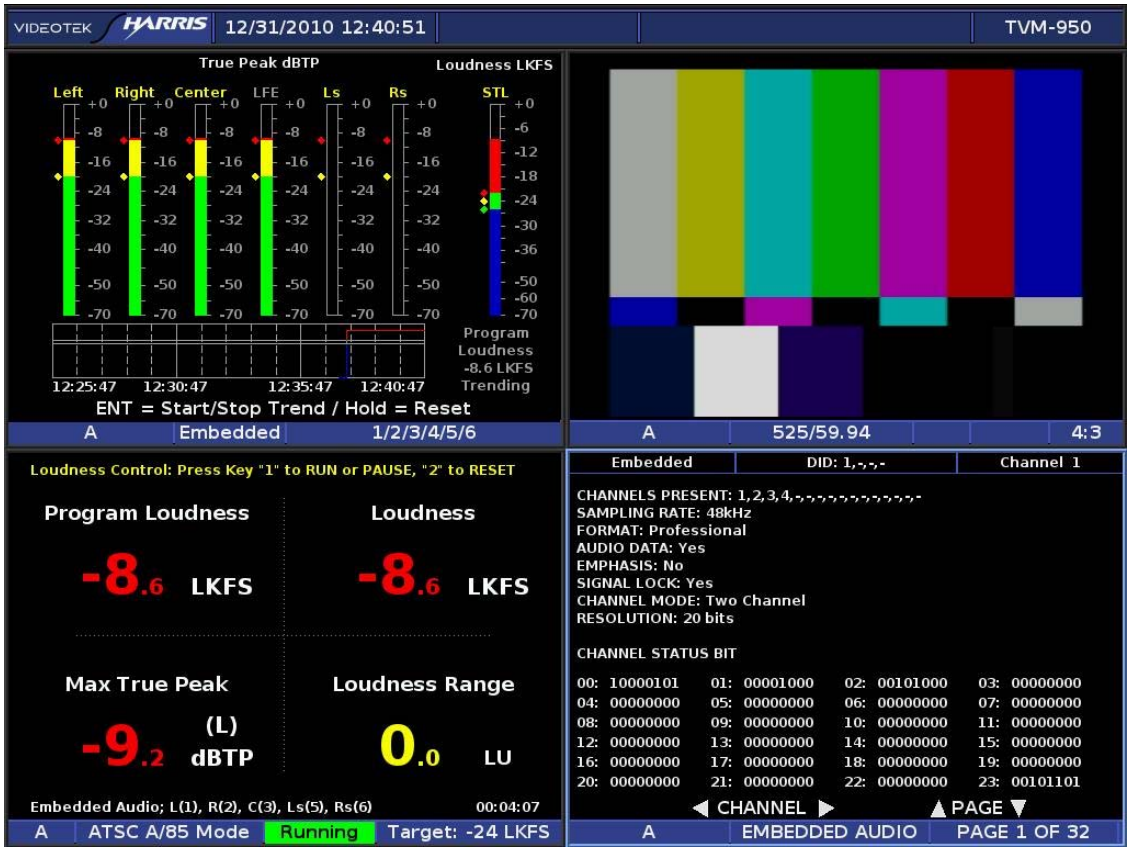
Figure 3-7. CineSound 7.1 Channels Display



Loudness Displays with TVM/VTM A3-OPT 3/5 TL

With TVM/VTM audio option A3-OPT 3/5 TL installed, Loudness Bar Display and Loudness Numeric Readout are available to visualize the loudness measurements. With the menu AUDIO SETUP > CONFIGURATION INPUT A through D > AUDIO DISPLAY > LOUDNESS checked, one loudness display alternates with the other by pressing the AUDIO button. Both loudness displays can show up in standard quad mode, like in **Figure 3-8**. Loudness Bar Display shows true peak and loudness status of 5.1 surround audio. The display contains six true peak audio meters, one BS.1770 loudness meter, and one loudness trending chart. Loudness Numeric Readout shows program loudness, short term integrated loudness, maximum true peak, and loudness range. The display supports three loudness metering modes, including ATSC A/85, EBU R 128, and Custom.

Figure 3-8. Loudness Displays in Standard Quad Mode with TVM/VTM A3-OPT 3/5 TL



Loudness channels are configured through the menu AUDIO SETUP > CONFIGURATION INPUT A through D > AUDIO DISPLAY > LOUDNESS MAPPING:

- **Left**: This selection configures the input of the Left loudness channel. The channel may be disabled, or use the input of audio meter 1 to 8.
- **Right**: This selection configures the input of the Right loudness channel. The channel may be disabled, or use the input of audio meter 1 to 8.
- **Center**: This selection configures the input of the Center loudness channel. The channel may be disabled, or use the input of audio meter 1 to 8.
- **LFE (True Peak Display Only)**: This selection configures the input of the LFE channel. The channel may be disabled, or use the input of audio meter 1 to 8. The LFE channel is used by the LFE true peak audio meter and is NOT included in the loudness calculation.
- **Left Surround**: This selection configures the input of the Left Surround loudness channel. The channel may be disabled, or use the input of audio meter 1 to 8.
- **Right Surround**: This selection configures the input of the Right Surround loudness channel. The channel may be disabled, or use the input of audio meter 1 to 8.

Loudness metering modes are configured through the menu AUDIO SETUP > CONFIGURATION INPUT A through D > AUDIO DISPLAY > LOUDNESS SETUP:

- **Mode**: This selection is used to select the desired loudness metering mode.
    - **ATSC A/85**: Follows ATSC recommended practice A/85.
    - **EBU R 128**: Follows EBU recommendation R 128.
    - **Custom**: This selection allows the user to select a mode that matches the user's in-house standards.
- **Units**: This selection is used to determine the type of scale that appears on the Loudness display.
    - **LKFS:** Loudness K-weighted Full Scale.
    - **LU:** Loudness Units.
- **ATSC A/85 Mode Setup:** Sets the ATSC A/85 loudness metering parameters. This setup is NOT active unless ATSC A/85 is selected in the menu **Mode**.
    - **Program:** This selection is used to set the usage of relative gating threshold applied to the calculation of program loudness. The setting Use Relative Gating is defaulted to off (Not enabled).
      If Use Relative Gating is enabled, the menu Relative Gating Value selects value from -20 to -6. The default setting is -8.
    - **Loudness Integration Time:** This selection is used to set the integration time for the calculation of integrated loudness. Selections are from 0 seconds to 60 seconds. The default selection is 10 seconds.
    - **Max Hold Time:** This selection is used to set the maximum true peak hold time. Selections are 1 to 10 seconds and Infinite. The default selection is Infinite.
    - **Range:** This selection is used to set the relative gating applied to the calculation of loudness range. The relative gating is enabled and the value is fixed at -20.
    - **Target Loudness:** This selection is used to set the desired loudness level.
        - **Level** selections range from -31 LKFS to -1 LKFS. The default selection is -24 LKFS.
        - **High Level Above Target** sets the range of allowable values above the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 2 LU.
        - **Low Level Below Target** sets the range of allowable values below the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 2 LU.
    - **Absolute Gating:** This selection is used to select the threshold for absolute gating applied to loudness calculation. The value specifies the loudness level below which there is only silence. Selections range from -70 LKFS to -50 LKFS. The default setting is -70 LKFS.

- **EBU R 128 Mode Setup:** Sets the EBU R 128 loudness metering parameters. This setup is NOT active unless EBU R 128 is selected in the menu **Mode**.
    - **Program:** This selection is used to set the usage of relative gating threshold applied to the calculation of program loudness. The relative gating is enabled and the value is fixed at -8.
    - **Short Term Integration:** This selection is used to set the integration time for the calculation of short term loudness. The selection is fixed at 3 seconds.
    - **Max Hold Time:** This selection is used to set the maximum true peak hold time. Selections are 1 to 10 seconds and Infinite. The default selection is Infinite.
    - **Range:** This selection is used to set the relative gating applied to the calculation of loudness range. The relative gating is enabled and the value is fixed at -20.
    - **Target Loudness:** This selection is used to set the desired loudness level.
        - **Level** is fixed at -23 LKFS.
        - **High Level Above Target** sets the range of allowable values above the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 1 LU.
        - **Low Level Below Target** sets the range of allowable values below the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 1 LU.
    - **Absolute Gating:** This selection is used to select the threshold for absolute gating applied to loudness calculation. The value specifies the loudness level below which there is only silence. The setting is fixed at -70 LKFS.
- **Custom Mode Setup:** This selection is used to match the user's in-house loudness metering parameters. This setup is NOT active unless Custom is selected in the menu **Mode**.
    - **Program:** This selection is used to set the usage of relative gating threshold applied to the calculation of program loudness. The setting Use Relative Gating is defaulted to on (Enabled).
      If Use Relative Gating is enabled, the menu Relative Gating Value selects value from -20 to -6. The default setting is -8.
    - **Loudness Integration Time:** This selection is used to set the integration time for the calculation of integrated loudness. Selections are from 0 seconds to 60 seconds. The default selection is 3 seconds.
    - **Max Hold Time:** This selection is used to set the maximum true peak hold time. Selections are 1 to 10 seconds and Infinite. The default selection is Infinite.

- **Range:** This selection is used to set the relative gating applied to the calculation of loudness range. If Use Relative Gating is ON, Relative Gating Value selects a value from -22 to -18. The default selection is -20.
- **Target Loudness:** This selection is used to set the desired loudness level.
  - **Level** selections range from -31 LKFS to -1 LKFS. The default selection is -23 LKFS.
  - **High Level Above Target** sets the range of allowable values above the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 1 LU.
  - **Low Level Below Target** sets the range of allowable values below the desired loudness level. Selections range from 1 LU to 10 LU. The default setting is 1 LU.
- **Absolute Gating:** This selection is used to select the threshold for absolute gating applied to loudness calculation. The value specifies the loudness level below which there is only silence. Selections range from -70 LKFS to -50 LKFS. The default setting is -70 LKFS.

- **Trend Time:** This selection is used to set the time scale of the loudness trending chart in Loudness Bar Display. Selections range from 15 seconds to 24 hours.

The source and scale of the loudness meter in Loudness Bar Display are configured through the menu AUDIO SETUP > METER SETUP > LOUDNESS:

- **ATSC A/85 Mode Setup:** Used to set the source and scale of the loudness meter. This setup is NOT active unless ATSC A/85 is selected as the menu **Mode**.
  - **Source:** This selection is used to specify the source that drives the loudness meter. Selections include Momentary Loudness and Short Term Loudness. The default selection is Momentary Loudness.
  - **LU Scale:** This selection is used to specify the maximum and minimum values the loudness meter can represent. This scale is NOT active unless LU is selected as the **Units** parameter.
    - **Top** selects the maximum value from 0 LU to 24 LU. The default is 24 LU.
    - **Bottom** selects the minimum values from -50 LU to -10 LU. The default is -46 LU.
  - **LKFS Scale:** This selection is used to specify the maximum and minimum values the loudness meter can represent. This scale is NOT active unless LKFS is selected as the **Units** parameter.
    - **Top** selects the maximum value from -20 LKFS to 10 LKFS. The default is 0 LKFS.
    - **Bottom** selects the minimum values from -70 LKFS to -30 LKFS. The default is -70 LKFS.

- **EBU R 128 Mode Setup:** Sets the source and scale of the loudness meter. This setup is NOT active unless EBU R 128 is selected as the menu **Mode**.
    - **Source:** This selection is used to specify the source that drives the loudness meter. Selections include Momentary Loudness and Short Term Loudness. The default selection is Momentary Loudness.
    - **Scale:** This selection is used to specify the EBU loudness scale the loudness meter uses. Selections include EBU+9, EBU+18, and Full Scale (i.e., -70 LKFS to +0 LKFS). The default selection is EBU +9.
- **Custom Mode Setup:** This selection allows user to set the source and scale of the loudness meter. This setup is NOT active unless Custom is selected as the menu **Mode**.
    - **Source:** This selection is used to specify the source that drives the loudness meter. Selections include Momentary Loudness and Short Term Loudness. The default selection is Momentary Loudness.
    - **LU Scale:** This selection is used to specify the maximum and minimum values the loudness meter can represent. This scale is NOT active unless LU is selected as the **Units** parameter.
        - **Top** selects the maximum value from 0 LU to 24 LU. The default is 23 LU.
        - **Bottom** selects the minimum values from -50 LU to -10 LU. The default is -47 LU.
    - **LKFS Scale:** This selection is used to specify the maximum and minimum values the loudness meter can represent. This scale is NOT active unless LKFS is selected as the **Units** parameter.
        - **Top** selects the maximum value from -20 LKFS to 10 LKFS. The default is 0 LKFS.
        - **Bottom** selects the minimum values from -70 LKFS to -30 LKFS. The default is -70 LKFS.

Loudness Bar Display with TVM/VTM A3-OPT 3/5 TL

Loudness Bar display is illustrated in **Figure 3-9** and described in **Table 3-7**.

Figure 3-9. Loudness Bar Display with TVM/VTM A3-OPT 3/5 TL

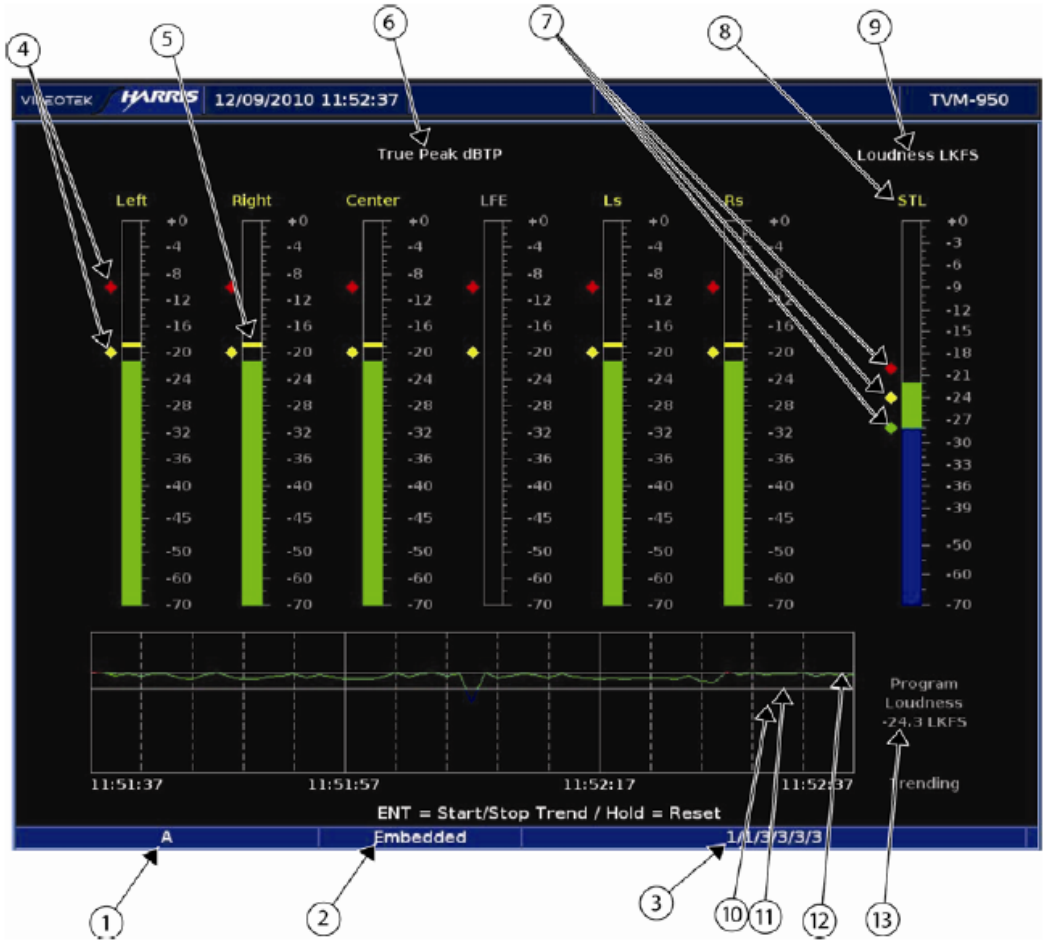


Table 3-7. Description of Loudness Bar Display with TVM/VTM A3-OPT 3/5 TL

Field Identifier	Field Information	Nomenclature
1	Input	Displays user-configurable source IDs for input
2	Audio Type	Displayed as Analog, AES, or Embedded
3	Monitored Audio Input Channels	Displayed information is option dependent; shown as 1 to 16 (Analog is 1-8, AES is 1-16 or 1-8, Embedded is 1-16)
4	Audio Meter Reference and Peak Levels	Indicates true peak reference and peak levels on audio meters, which can be set in menu AUDIO SETUP > METER SETUP > REF LEVEL and AUDIO SETUP > METER SETUP > PK PROGRAM LEVEL DIG > dBFS

Field Identifier	Field Information	Nomenclature
5	Audio Meter Floating Peak	Displayed as floating peak on true peak audio meters. The peak hold time can be set in menu AUDIO SETUP > CONFIGURE INPUT A through D > AUDIO DISPLAY > LOUDNESS SETUP > ATSC A/85 (or EBU R 128, Custom) MODE SETUP > MAX HOLD TIME
6	Audio Meter Response and Scale	The first six audio meters show true peak levels in full dBFS scale (-70 dB to 0 dB)
7	Loudness Meter Target Level / High Level Above Target /Low Level Below Target	Indicates high level above target (red diamond), target level (yellow diamond), and low level below target (green diamond) on the loudness meter, which can be set in menu AUDIO SETUP > CONFIGURE INPUT A through D > AUDIO DISPLAY > LOUDNESS SETUP > ATSC A/85 (or EBU R 128, Custom) MODE SETUP > TARGET LOUDNESS
8	Loudness Meter Source	Indicates the loudness meter is driven by momentary or short term loudness value
9	Loudness Meter Scale	Indicates the scale used by the loudness meter
10	Loudness Trending Chart	The trending chart is used to view short-term loudness readings within user-selectable time period. The time can range from 15 seconds to 24 hours. Press the ENT button to Start and Stop the Trending chart. Press and hold the ENT button for five seconds to clear the trending chart.
11	Low Level Below Target Loudness Line	The line shows the loudness value at Low Level Below Target. Trending points below the line are blue, while those above the line are green
12	High Level Above Target Loudness Line	The line shows the loudness value at High Level Above Target. Trending points below the line are green, while those above the line are red
13	Program Loudness	The field shows the readout of program loudness

Loudness Numeric Readout with TVM/VTM A3-OPT 3/5 TL

Loudness Numeric Readout is illustrated in **Figure 3-10** and described in **Table 3-8**.

Figure 3-10. Loudness Numeric Readout with TVM/VTM A3-OPT 3/5 TL

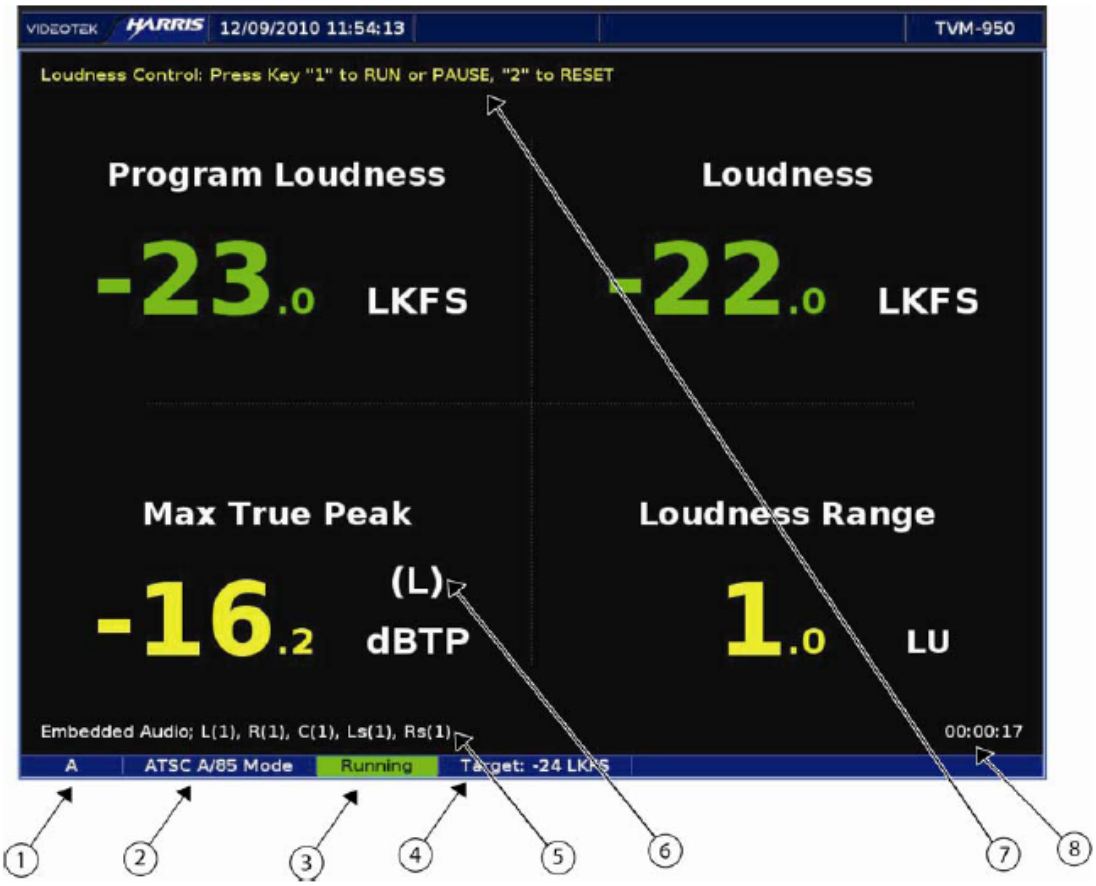


Table 3-8. Description of Loudness Numeric Readout with TVM/VTM A3-OPT 3/5 TL

Field Identifier	Field Information	Nomenclature
1	Input	Displays user-configurable source IDs for input
2	Loudness Metering Mode	Displays loudness metering mode ATSC A/85, EBU R 128, or Custom
3	Loudness Integration Status	Shows the status of loudness integrator. On running, it keeps collecting loudness samples; when paused, it discards loudness samples.
4	Target Loudness	Displays the desirable loudness level
5	Audio Type and Loudness Channel Mapping	The audio type is displayed as Analog, AES or Embedded. The loudness channel mapping is displayed as loudness/surround channel label with audio input channel.

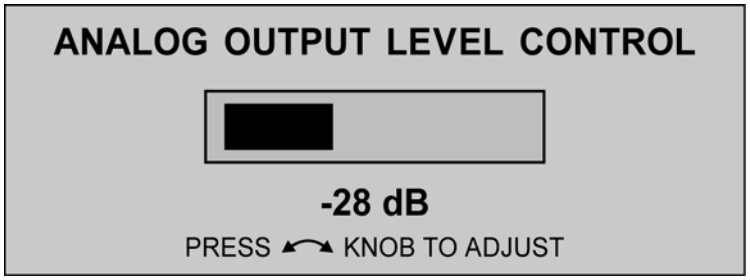
Field Identifier	Field Information	Nomenclature
6	Channel with Max True Peak	Shows which channel underwent the maximum true peak.
7	Loudness Control Instruction	The instruction tells the user to how to control the loudness integrator. Pushing numeric key "1" makes the loudness integrator run or pause. Pushing key "2" resets the calculation of program loudness and loudness range. The control is also applied to maximum true peak.
8	Program Clock	Shows how long the loudness integrator has been running.

Analog Audio Output Level Control

The CURVED ARROW knob is used as an Analog Audio Output Level Control when an audio option is installed and the Audio Pane is selected (highlighted). The CURVED ARROW symbol is high tally under these conditions to indicate the Output Level Control function. When the knob is first rotated, a pop-up control panel appears over the center of the Audio pane.

The Analog Output Level Control panel, shown in **Figure 3-11**, consists of a title (Analog Output Level Control), the numeric level readout in dB, the level bargraph (representing an approximate linear scale of the setting), conditional text messages (MIN, MAX), and a status message (Press Knob to Adjust or Press Knob to Exit).

Figure 3-11. Analog Output Level Control Display



When the control panel appears, it is in an inactive mode. Press the CURVED ARROW knob to enable the control panel. The control panel enables the adjustment of the appropriate analog output level based on the audio type assigned for the input. Rotate the CURVED ARROW knob to make adjustments. The knob rotational sensitivity is 1dB per click.

When the control is set to the minimum value (-50 dB) the MIN text appears to the left of the level bargraph, as shown in **Figure 3-12**. When the control is set to the maximum value (+6 dB), the MAX text appears to the right of the level bargraph, as shown in **Figure 3-13**.

Figure 3-12. Audio Output Level Control Panel with MIN Displayed

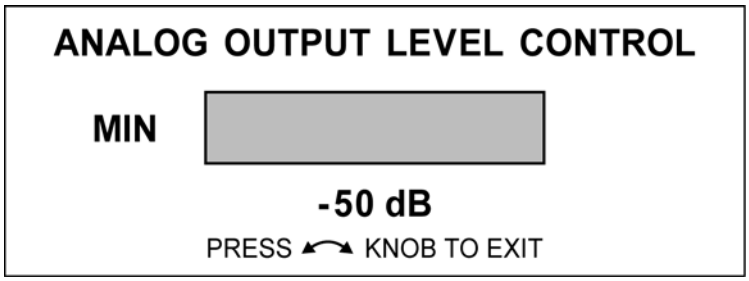
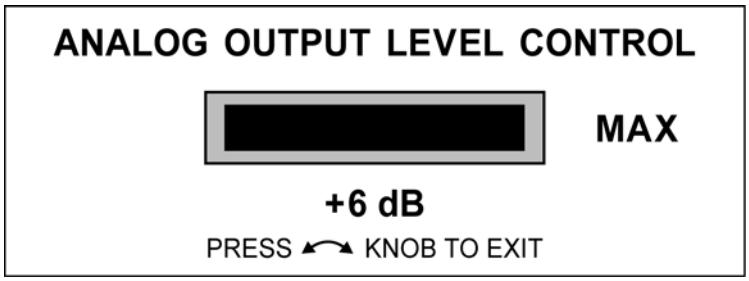


Figure 3-13. Audio Output Level Control Panel with MAX Displayed



When the Output Level Control is enabled for adjustment, pressing the CURVED ARROW knob clears the control panel from the Audio Pane. Entering either the pane setup menu or global setup menu also clears the control panel. The control panel also clears if no action is performed after the timeout interval of five seconds. The last setting is retained and reflected in the Setup menu.

Audio Menu Selections

Pressing and holding the AUDIO function button in the active audio pane selects the audio pane menu. The Audio Pane menu is described in **Table 3-9**.

Table 3-9. Alarm Pane Menu

AUDIO INPUT CHECK	ANALOG
	AES 1 – 4
	AES 5 – 8
	EMBEDDED 1 – 8
	EMBEDDED 9 – 16
V2A TIMING DISPLAY (TVM/VTM-OPT V2A Option only)	OFF (Default)
	ON
LISSAJOUS	SOUNDSTAGE
	X – Y
AUDIO SETUP	Press ENT

Audio Input Check

The Audio Input Check is a quick way of checking the audio sources. It displays and changes 8-CH bargraphs with the input source selected from the pane menus. It overrides input selections and is only active while it is enabled.

V2A Timing Display (TVM/VTM-OPT V2A only)

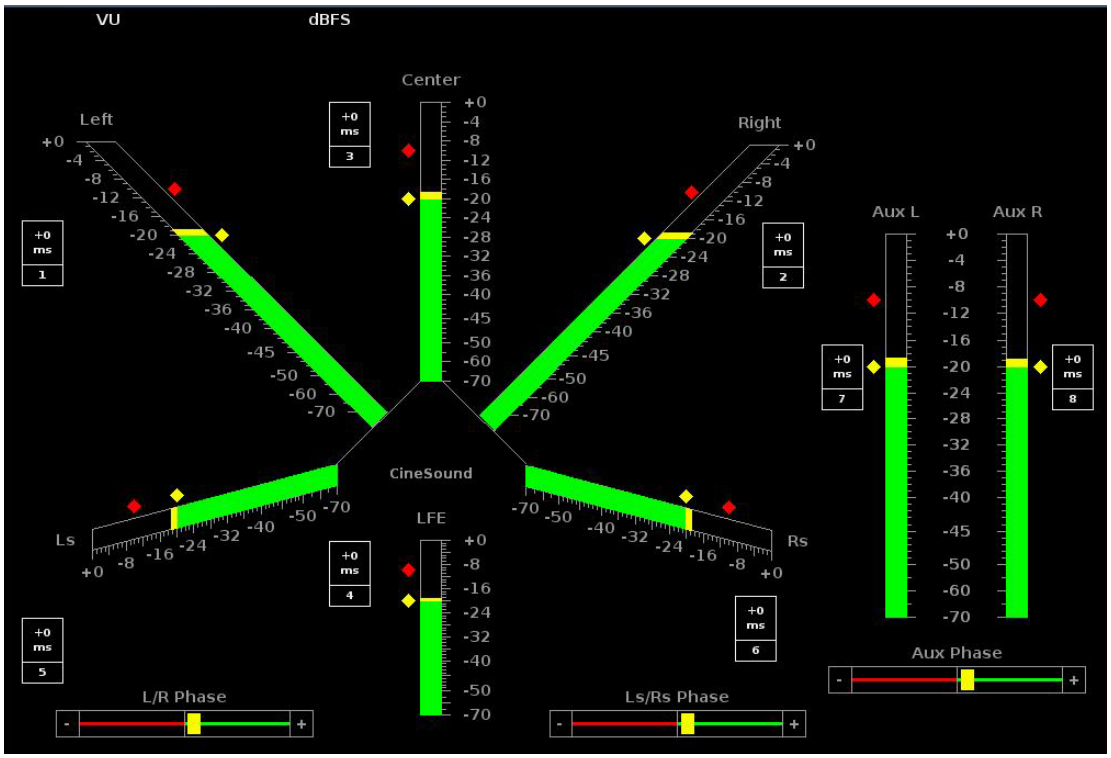
NOTE: The TVM/VTM OPT V2A option is only available when the TVM/VTM A3-OPT 3TL or TVM/VTM A3-OPT 5TL is purchased. The V2A option must be used with the video/audio timing test signal from an X85, VSG-410, GEN-STAR, or TSG-3901. The video/audio timing test signal takes approximately five seconds to generate audio/video timing information for all of the inputs. To prevent processing errors, all unused audio channels must be routed to tone or mute on the X85.

The TVM/VTM-OPT V2A option is used to receive a video/audio timing test signal and analyze the timing between the video signal and the audio signal. The V2A (Video-to-Audio) Timing Display menu is used to enable and disable the Lip Sync Timing display. After analysis, the V2A Lip Sync Timing display, when enabled, shows the audio and video timing differences (if any) that occur during the following processes:

- Up, cross, and down conversion
- Analog-to-digital conversion
- Digital-to-analog conversion
- MPEG coding and decoding

Lip sync indicators appear next to each channel in the bar graph and CineSound displays, as shown in sample **Figure 3-14**. The markers indicate the channel number and the timing difference in milliseconds. The indicators do not appear on the loudness display. Positive numbers indicate that the audio is leading the video. Negative numbers indicate that the audio is lagging the video. ? indicates that no timing signal is present, no video signal is present, or no audio signal is present.

Figure 3-14. Lip Sync Sample Screen



Lissajous

Select to determine the type of Lissajous display that appears in the Audio pane. There are two type of Lissajous displays (Soundstage and X-Y). The soundstage selection displays a lissajous, which is rotated so that the in-phase signals appear on the vertical axis and out of phase signals appear on the horizontal axis.

X-Y displays a lissajous with the left channel mapped to the vertical axis, and the right channel mapped to the horizontal axis.

Audio Setup

Press the ENT button to access the global Audio Setup menu.

Menu Structure

Use the menus and descriptions in conjunction with the appropriate *Installation and Operation Handbook* to make specific setup selections for a specific application.

Table 3-10. Audio Setup Menu with A3-OPT 2

CONFIGURE INPUT(S) A or B	**AUDIO TYPE**	ANALOG	-	-
		AES/EBU	-	-
		EMBEDDED	-	-
	AUDIO DISPLAY	2 CHANNELS	-	-
		4 CHANNELS	-	-
		4 CHANNEL SETUP	M-1 SUM & DIFF	-
			M-2 SUM & DIFF	-
		6 CHANNELS	-	-
		6 CHANNEL SETUP	VERTICAL	
			CINESOUND 5.1	-
		8 CHANNELS	-	-
		8 CHANNEL SETUP	VERTICAL	-
			CINESOUND 5.1 + AUX (Default)	-
	I/O MAPPING	**ANALOG**	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		AES/EBU	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		EMBEDDED	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN

(Table continues on next page)

Table 3-10. Audio Setup Menu with A3-OPT 2 (*continued*)

METER SETUP	**REF LEVEL ANALOG (dBm)**	-10 TO +12 (1 dB STEPS) (0 is the Default)	-	-
	REF LEVEL DIGITAL (dBFS)	-22 TO –8 (1 dB STEPS) (-20 is the default)	-	-
	PEAK PROGRAM LEVEL ANL (ANALOG)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		CUSTOM DB	1 TO 19 dB	-
	PEAK PROGRAM LEVEL DIG (DIGITAL)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		dBFS	1 TO 21 dB	-
		ZERO REF dBFS	1 TO 21 dB	-
		CUSTOM dB	1 TO 21 dB	-
		CUSTOM dBFS	1 TO 21 dB	-
	ANALOG SCALE	TYPE I (Default)	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		CUSTOM dB	-	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the default)	-
		CUSTOM dB BOTTOM	-70 TO –20 dB (-30 is the default)	-

(Table continues on next page)

Table 3-10. Audio Setup Menu with A3-OPT 2 (*continued*)

METER SETUP (CONT)	**DIGITAL SCALE**	TYPE I	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		DBFS	-	-
		ZERO REF dBFS	-	-
		CUSTOM dBFS	-	-
		CUSTOM dB	-	-
		CUSTOM dBFS TOP	-20 TO 0 dB (0 is the default)	-
		CUSTOM dBFS BOTTOM	-40 TO –90 dB (-40 is the default)	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the default)	-
		CUSTOM dB BOTTOM	-70 TO –20 dB (-30 is the default)	-
	METER RESPONSE	VU (Default)	-	-
		PEAK	-	-
		TRUE PEAK	-	-
		VU + PEAK	-	-
		VU + TRUE PEAK	-	-
		CUSTOM	-	-
		LOUDNESS	-	-
		CUSTOM ATTACK	0 TO 20 ms (10 is the default)	
		CUSTOM DECAY	0.1 TO 5.0 SECONDS (0.1 increment (1.5 is the Default)	
		LOUDNESS INTEGRATION	1, 5, 10, 30, 60 SECONDS (5 Seconds is the Default)	

(Table continues on next page)

Table 3-10. Audio Setup Menu with A3-OPT 2 (*continued*)

METER SETUP (CONT)	**PEAK HOLD**	**PEAK HOLD TIME**	OFF	-
			1 TO 10 SECONDS	-
			INFINITE	-
		RESET PEAK	-	-
	METER LABELS	STEREO PAIRS	-	-
		SMPTE 320M	-	-
		CUSTOM	-	-
		EDIT CUSTOM LABELS	**METER 1 TO 8**	RENAME SCREEN
	LISSAJOUS SETUP	**PERSISTENCE**	1 TO 10 (5 is the Default)	-
		ATTACK	1 TO 10 (5 is the Default)	-
		AGC	OFF	-
			ON (Default)	-
	CONFIGURE PHASE BAR(S)	**POLARITY**	NORMAL (Default)	-
			REVERSE	-
		DAMPING	FAST, 1 TO 10, SLOW (FAST is Default)	-
	LFE OFFSET	NONE (Default)	-	-
		-10 dB	-	-
	CINESOUND DIRECTION	OUTWARD (Default)	-	-
		INWARD	-	-
	AUDIO MARKERS	**DISPLAY**	OFF	-
			ON	-
		POSITION	-50 dB TO +12 dB (0 is the Default)	-
AES VALIDITY BIT	ENABLED (Default)	-	-	-
	DISABLED	-	-	-

(Table continues on next page)

Table 3-10. Audio Setup Menu with A3-OPT 2 (*continued*)

OUTPUT PREFERENCES	**MUTE UNSELECTED INPUTS**	OFF (Default)	-	-
		ON	-	-
	AES OUTPUTS	OFF (Default)	-	-
		ON	-	-
	ANALOG OUTPUT LEVEL	**ANALOG INPUT**	-50 dB (MUTE) TO +6 dB (0 is the Default)	-
		DIGITAL INPUT	-50 dB (MUTE) TO +6 dB (0 is the Default)	-

Table 3-11. Audio Setup Menu with A3-OPT 3

CONFIGURE INPUT(S) A, B, C, or D	**AUDIO TYPE**	ANALOG	-	-
		AES/EBU	-	-
		EMBEDDED	-	-
		DOLBY AES	-	-
		DOLBY EMBEDDED	-	-
	AUDIO DISPLAY	2 CHANNELS	-	-
		4 CHANNELS	-	-
		4 CHANNEL SETUP	M-1 SUM & DIFF	-
			M-2 SUM & DIFF	-
		6 CHANNELS	-	-
		6 CHANNEL SETUP	VERTICAL	
			CINESOUND 5.1	-
		8 CHANNELS	-	-
		8 CHANNEL SETUP	VERTICAL	-
			CINESOUND 5.1 + AUX (Default)	-
			CINESOUND 6.1	-
			CINESOUND 7.1	-
	I/O MAPPING	**ANALOG**	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		AES/EBU	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		EMBEDDED	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN

(Table continues on next page)

Table 3-11. Audio Setup Menu with A3-OPT 3 (*continued*)

METER SETUP	**REF LEVEL ANALOG (dBm)**	-10 TO +12 (1 dB STEPS) (0 is the Default)	-	-
	REF LEVEL DIGITAL (dBFS)	-22 TO –8 (1 dB STEPS) (-20 is the default)	-	-
	PEAK PROGRAM LEVEL ANL (ANALOG)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		CUSTOM DB	1 TO 19 dB	-
	PEAK PROGRAM LEVEL DIG (DIGITAL)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		DBFS	1 TO 21 dB	-
		ZERO REF dBFS	1 TO 21 dB	-
		CUSTOM dB	1 TO 21 dB	-
		CUSTOM dBFS	1 TO 21 dB	-
	ANALOG SCALE	TYPE I (Default)	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		CUSTOM dB	-	-
		CUSTOM dB TOP	0 TO 20 (1 dB STEPS) (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO –20 in 5dB STEPS (-30 is the Default)	-

(Table continues on next page)

Table 3-11. Audio Setup Menu with A3-OPT 3 (*continued*)

METER SETUP (CONT)	**DIGITAL SCALE**	TYPE I	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		DBFS	-	-
		ZERO REF dBFS	-	-
		CUSTOM dBFS	-	-
		CUSTOM dB	-	-
		CUSTOM dBFS TOP	-20 TO 0 dBFS (0 is the Default)	-
		CUSTOM dBFS BOTTOM	-40 TO –90 dBFS (-40 is the Default)	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO –20 dB (-30 is the Default)	-
	METER RESPONSE	VU (Default)	-	-
		PEAK	-	-
		TRUE PEAK	-	-
		VU + PEAK	-	-
		VU + TRUE PEAK	-	-
		CUSTOM	-	-
		LOUDNESS	-	-
		CUSTOM ATTACK	0 TO 20 ms (10 is the Default)	
		CUSTOM DECAY	0.1 TO 5.0 SECONDS (0.1 increment (1.5 is the Default)	
		LOUDNESS INTEGRATION	1, 5, 10, 30, 60 SECONDS (5 Seconds is the Default)	

(Table continues on next page)

Table 3-11. Audio Setup Menu with A3-OPT 3 (*continued*)

METER SETUP (CONT)	**PEAK HOLD**	**PEAK HOLD TIME**	OFF	-
			1 TO 10 SECONDS	-
			INFINITE	-
		RESET PEAK	-	-
	METER LABELS	STEREO PAIRS	-	-
		SMPTE 320M	-	-
		CUSTOM		
		EDIT CUSTOM LABELS	**METER 1 TO 8**	RENAME SCREEN
	LISSAJOUS SETUP	**PERSISTENCE**	1 TO 10 (5 is the Default)	-
		ATTACK	1 TO 10 (5 is the Default)	-
		AGC	OFF	-
			ON (Default)	-
	CONFIGURE PHASE BAR(S)	**POLARITY**	NORMAL (Default)	-
			REVERSE	-
		DAMPING	FAST, 1 TO 10, SLOW (FAST is Default)	-
	LFE OFFSET	NONE (Default)	-	-
		-10 dB	-	-
	CINESOUND DIRECTION	OUTWARD (Default)	-	-
		INWARD	-	-
	AUDIO MARKERS	**DISPLAY**	OFF	-
			ON	-
		POSITION	-50 dB TO +12 dB (0 is the Default)	-
AES VALIDITY BIT	ENABLED (Default)	-	-	-
	DISABLED	-	-	-

(Table continues on next page)

Table 3-11. Audio Setup Menu with A3-OPT 3 (*continued*)

OUTPUT PREFERENCES	**MUTE UNSELECTED INPUTS**	OFF (Default)	-	-
		ON	-	-
	AES OUTPUTS	OFF (Default)	-	-
		ON	-	-
	ANALOG OUTPUT LEVEL	**ANALOG INPUT**	-50 dB (MUTE) TO +6 dB (0 is the Default)	-
		DIGITAL INPUT	-50 dB (MUTE) TO +6 dB (0 is the Default)	-

Table 3-12. Audio Setup Menu with A3-OPT 5

CONFIGURE INPUT(S) A, B, C, or D	**AUDIO TYPE**	ANALOG	-	-
		AES/EBU	-	-
		EMBEDDED	-	-
		DOLBY AES	-	-
		DOLBY EMBEDDED	-	-
	AUDIO DISPLAY	2 CHANNELS	-	-
		4 CHANNELS	-	-
		4 CHANNEL SETUP	M-1 SUM & DIFF	-
			M-2 SUM & DIFF	-
		6 CHANNELS	-	-
		6 CHANNEL SETUP	VERTICAL	
			CINESOUND 5.1	-
		8 CHANNELS	-	-
		8 CHANNEL SETUP	VERTICAL	-
			CINESOUND 5.1 + AUX (Default)	-
			CINESOUND 6.1	-
			CINESOUND 7.1	-
	I/O MAPPING	**ANALOG**	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		AES/EBU	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**I/O MAPPING (CONT)**	**EMBEDDED**	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
	DOLBY SETUP	**DISPLAY INPUT**	INPUT 1 TO INPUT 8	-
		DOLBY INPUT FORMAT	**AUTODETECT**	OFF/ON
			8 CHANNEL DOLBY E	OFF/ON
			6 CHANNEL DOLBY E	OFF/ON
			4 CHANNEL DOLBY E	OFF/ON
			DOLBY DIGITAL	OFF/ON
			8 CHANNEL DOLBY E MODE	OFF/ON
			8 CHANNEL DOLBY E	5.1+2
				5.1+2x1
				2x4
				4+2x2
				4+2+2x1
				4+4x1
				4x2
				3x2+2x1
				2x2+4x1
				2+6x1
				8x1
			6 CHANNEL DOLBY E	5.1
				4+2
				4+2x1
				3x2
				2x2+2x1
				2+4x1
				6x1
			4 CHANNEL DOLBY E	4
				2x2
				2+2x1
				4x1

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**DOLBY SETUP (CONT)**	**DOLBY INPUT FORMAT (CONT)**	**DOLBY DIGITAL**	3/2L
				3/2
				2/2L
				2/2
				3/1L
				3/1
				2/1L
				2/1
				3/0L
				3/0
				2/0
				1/0
				1/1
		PULLDOWN MODE	DISABLED (Default)	-
			ENABLED	-
		AES CH SELECT	CH 1 (Default)	-
			CH 2	-
		AUX OUTPUT MAPPING	**PROGRAM SELECT**	1 to 8 (The default is 1)
			DOLBY E 5.1CH	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt (Default)
			DOLBY E 4 CH	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt (Default)
			DOLBY E 2CH	MUTE
				L+R/L+R
				L/R
			DOLBY E 1CH	MUTE
				C/C

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**DOLBY SETUP (CONT)**	**AUX OUTPUT MAPPING (CONT)**	**DOLBY D 3/2**	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 2/2	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 3/1	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY 2/1	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 3/0	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 2/0	MUTE
				L+R/L+R
				L/R
			DOLBY D 1/0	MUTE
				C/C
			DOLBY D 1/1	MUTE
				L+R/L+R
				L/R
		DOWNMIX SELECT	OFF	-
			ON	-
		DOLBY D CRC MODE	BYPASS	-
			CUSTOM	-
			RF	-
			LINE	-
		AUX CH RANGE DRC MODE	RF	-
			LINE	-

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

CONFIGURE INPUT(S) A/B or OPT C/D (CONT)	**DOLBY SETUP (CONT)**	**DOLBY E DIAL NORM**	DISABLE	-
			ALL PGM ENABLED	-
			PGM 1 ENABLED	-
		DOLBY D LISTENING MODE	FULL (Default)	-
			EX	-
			3 STEREO	-
			PHANTOM	-
			STEREO	-
			MONO	-
		PRO LOGIC	OFF (Default)	-
			ON	-
METER SETUP	**REF LEVEL ANALOG (dBm)**	-10 TO +12 (1 dB STEPS) (0 is the Default)	-	-
	REF LEVEL DIGITAL (dBFS)	-22 TO –8 (1 dB STEPS) (-20 is the default)	-	-
	PEAK PROGRAM LEVEL ANL (ANALOG)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		CUSTOM DB	1 TO 19 dB	-
	PEAK PROGRAM LEVEL DIG (DIGITAL)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		DBFS	1 TO 21 dB	-
		ZERO REF dBFS	1 TO 21 dB	-
		CUSTOM dB	1 TO 21 dB	-
		CUSTOM dBFS	1 TO 21 dB	-

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

METER SETUP (CONT)	**ANALOG SCALE**	TYPE I (Default)	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		CUSTOM dB	-	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO –20 dB (-30 is the Default)	-
	DIGITAL SCALE	TYPE I	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		dBFS	-	-
		ZERO REF dBFS	-	-
		CUSTOM dBFS	-	-
		CUSTOM dB	-	-
		CUSTOM dBFS TOP	-20 TO 0 dBFS (0 is the Default)	-
		CUSTOM dBFS BOTTOM	-40 TO –90 dBFS (-40 is the Default)	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO -20 dB (-30 is the Default)	-
	METER RESPONSE	VU (Default)	-	-
		PEAK	-	-
		TRUE PEAK	-	-
		VU + PEAK	-	-
		VU + TRUE PEAK	-	-

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

METER SETUP (CONT)	**METER RESPONSE (CONT)**	CUSTOM	-	-
		LOUDNESS	-	-
		CUSTOM ATTACK	0 TO 20 ms (10 is the Default)	
		CUSTOM DECAY	0.1 TO 5.0 SECONDS (0.1 increment (1.5 is the Default)	
		LOUDNESS INTEGRATION	1, 5, 10, 30, 60 SECONDS (5 Seconds is the Default)	
	PEAK HOLD	**PEAK HOLD TIME**	OFF	-
			1 TO 10 SECONDS	-
			INFINITE	-
		RESET PEAK	-	-
	METER LABELS	STEREO PAIRS	-	-
		SMPTE 320M	-	-
		CUSTOM		
		EDIT CUSTOM LABELS	**METER 1 TO 8**	RENAME SCREEN
	LISSAJOUS SETUP	**PERSISTENCE**	1 TO 10 (5 is the Default)	-
		ATTACK	1 TO 10 (5 is the Default)	-
		AGC	OFF	-
			ON (Default)	-
	CONFIGURE PHASE BAR(S)	**POLARITY**	NORMAL (Default)	-
			REVERSE	-
		DAMPING	FAST, 1 TO 10, SLOW (FAST is Default)	-
	LFE OFFSET	NONE (Default)	-	-
		-10 dB	-	-
	CINESOUND DIRECTION	OUTWARD (Default)	-	-
		INWARD	-	-

(Table continues on next page)

Table 3-12. Audio Setup Menu with A3-OPT 5 (*continued*)

METER SETUP (CONT)	**AUDIO MARKERS**	**DISPLAY**	OFF	-
			ON	-
		POSITION	-50 dB TO +12 dB (0 is the Default)	-
AES VALIDITY BIT	ENABLED (Default)	-	-	-
	DISABLED	-	-	-
OUTPUT PREFERENCES	**MUTE UNSELECTED INPUTS**	OFF (Default)	-	-
		ON	-	-
	AES OUTPUTS	OFF (Default)	-	-
		ON	-	-
	DOLBY OUTPUT	OFF	-	-
		ON (Default)	-	-
	ANALOG OUTPUT LEVEL	**ANALOG INPUT**	-50 dB (MUTE) TO +6 dB (0 is the Default)	-
		DIGITAL INPUT	-50 dB (MUTE) TO +6 dB (0 is the Default)	-

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL

CONFIGURE INPUT(S) A, B, C, or D	**AUDIO TYPE**	ANALOG	-	-
		AES/EBU	-	-
		EMBEDDED	-	-
		DOLBY AES	-	-
		DOLBY EMBEDDED	-	-
	AUDIO DISPLAY	2 CHANNELS	-	-
		4 CHANNELS	-	-
		4 CHANNEL SETUP	M-1 SUM & DIFF	-
			M-2 SUM & DIFF	-
		6 CHANNELS	-	-
		6 CHANNEL SETUP	VERTICAL	
			CINESOUND 5.1	-
		8 CHANNELS	-	-
		8 CHANNEL SETUP	VERTICAL	-
			CINESOUND 5.1 + AUX (Default)	-
			CINESOUND 6.1	-
			CINESOUND 7.1	-
		LOUDNESS	-	-
		LOUDNESS MAPPING	**Left**	Disabled, Meter 1 to 8 (Default to Meter 1)
			Right	Disabled, Meter 1 to 8 (Default to Meter 2)
			Center	Disabled, Meter 1 to 8 (Default to Meter 3)
			LFE (True Peak Display Only)	Disabled, Meter 1 to 8 (Default to Meter 4)
			Left Surround	Disabled, Meter 1 to 8 (Default to Meter 5)
			Right Surround	Disabled, Meter 1 to 8 (Default to Meter 6)

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**AUDIO DISPLAY (CONT)**	**LOUDNESS SETUP**	***Refer to Table 3-14 (Page 3-51):*** ***Loudness Metering Mode and Display Setup Menu***	
	I/O MAPPING	**ANALOG**	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		AES/EBU	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
		EMBEDDED	**BAR TO INPUT MAP**	MATRIX SCREEN
			ANALOG OUTPUT MAP	MATRIX SCREEN
	DOLBY SETUP (TVM/VTM A3-OPT 5-TL only)	**DISPLAY INPUT**	INPUT 1 TO INPUT 8	-
		DOLBY INPUT FORMAT	**AUTODETECT**	OFF/ON
			8 CHANNEL DOLBY E	OFF/ON
			6 CHANNEL DOLBY E	OFF/ON
			4 CHANNEL DOLBY E	OFF/ON
			DOLBY DIGITAL	OFF/ON
			8 CHANNEL DOLBY E MODE	OFF/ON
			8 CHANNEL DOLBY E	5.1+2
				5.1+2x1
				2x4
				4+2x2
				4+2+2x1
				4+4x1

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**DOLBY SETUP (CONT) (TVM/VTM A3-OPT 5-TL only)**	**DOLBY INPUT FORMAT (CONT)**	**8 CHANNEL DOLBY E (CONT)**	4x2
				3x2+2x1
				2x2+4x1
				2+6x1
				8x1
			6 CHANNEL DOLBY E	5.1
				4+2
				4+2x1
				3x2
				2x2+2x1
				2+4x1
				6x1
			4 CHANNEL DOLBY E	4
				2x2
				2+2x1
				4x1
			DOLBY DIGITAL	3/2L
				3/2
				2/2L
				2/2
				3/1L
				3/1
				2/1L
				2/1
				3/0L
				3/0
				2/0
				1/0
				1/1
		PULLDOWN MODE	DISABLED (Default)	-
			ENABLED	-
		AES CH SELECT	CH 1 (Default)	-
			CH 2	-

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**DOLBY SETUP (CONT) (TVM/VTM A3-OPT 5-TL only)**	**AUX OUTPUT SOURCE**	OFF (Default)	-
			Dolby Downmix	-
			Pair 1	-
			Pair 2	-
			Pair 3	-
			Pair 4	-
			Pair 5	-
			Pair 6	-
			Pair 7	-
			Pair 8	-
		DOWNMIX SELECT	**PROGRAM SELECT**	1 (Default)
				2
				3
				4
				5
				6
				7
				8
			DOLBY E 5.1CH	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt (Default)
			DOLBY E 4 CH	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt (Default)
			DOLBY E 2CH	MUTE
				L+R/L+R
				L/R
			DOLBY E 1CH	MUTE
				C/C
			DOLBY D 3/2	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

CONFIGURE INPUT(S) A, B, C, or D (CONT)	**DOLBY SETUP (CONT) (TVM/VTM A3-OPT 5-TL only)**	**DOWNMIX SELECT (CONT)**	**DOLBY D 2/2**	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 3/1	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY 2/1	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 3/0	MUTE
				Lo+Ro/Lo+Ro
				Lo/Ro
				Lt/Rt
			DOLBY D 2/0	MUTE
				L+R/L+R
				L/R
			DOLBY D 1/0	MUTE
				C/C
			DOLBY D 1/1	MUTE
				L+R/L+R
				L/R
		DOLBY D DRC MODE	BYPASS	-
			CUSTOM	-
			RF	-
			LINE	-

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

CONFIGURE INPUT(S) A/B or OPT C/D (CONT)	**DOLBY SETUP (CONT) (TVM/VTM A3-OPT 5-TL only)**	**AUX CH RANGE DRC MODE**	RF	-
			LINE	-
		DOLBY E DIAL NORM	DISABLE	-
			ALL PGM ENABLED	-
			PGM 1 ENABLED	-
		DOLBY D LISTENING MODE	FULL (Default)	-
			EX	-
			3 STEREO	-
			PHANTOM	-
			STEREO	-
			MONO	-
		PRO LOGIC	OFF (Default)	-
			ON	-
METER SETUP	**REF LEVEL**	**REF LEVEL ANALOG (dBm)**	-10 TO +12 (1 dB STEPS) (0 is the Default)	-
		REF LEVEL DIGITAL (dBFS)	-22 TO –8 (1 dB STEPS) (-20 is the Default) measured from Ref Loudness	-
	LOUDNESS	***Refer to Table 3-15 (Page 3-53): Loudness Bar Setup Menu***		
	PEAK PROGRAM LEVEL ANL (ANALOG)	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
		DIN 45406	1 TO 13 dB	-
		CUSTOM DB	1 TO 19 dB	-

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

METER SETUP (CONT)	**PEAK PROGRAM LEVEL DIG (DIGITAL)**	**TYPE I**	1 TO 11 dB	-
		TYPE IIa	1 TO 11 dB	-
		TYPE IIb	1 TO 11 dB	-
		TYPE I + 8	1 TO 19 dB	-
		NORDIC	1 TO 11 dB	-
	PEAK PROGRAM LEVEL DIG (DIGITAL) (CONT)	**DIN 45406**	1 TO 13 dB	-
		DBFS	1 TO 21 dB	-
		ZERO REF dBFS	1 TO 21 dB	-
		CUSTOM dB	1 TO 21 dB	-
		CUSTOM dBFS	1 TO 21 dB	-
	ANALOG SCALE	TYPE I (Default)	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
	ANALOG SCALE (CONT)	NORDIC	-	-
		DIN 45406	-	-
		CUSTOM dB	-	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO –20 dB (-30 is the Default)	-
	DIGITAL SCALE	TYPE I	-	-
		TYPE IIa	-	-
		TYPE IIb	-	-
		TYPE I + 8	-	-
		NORDIC	-	-
		DIN 45406	-	-
		dBFS	-	-

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

METER SETUP (CONT)	**DIGITAL SCALE**	ZERO REF dBFS	-	-
		CUSTOM dBFS	-	-
		CUSTOM dB	-	-
		CUSTOM dBFS TOP	-20 TO 0 dBFS (0 is the Default)	-
		CUSTOM dBFS BOTTOM	-40 TO –90 dBFS (-40 is the Default)	-
		CUSTOM dB TOP	0 TO 20 dB (+10 is the Default)	-
		CUSTOM dB BOTTOM	-70 TO -20 dB (-30 is the Default)	-
	METER RESPONSE	VU (Default)	-	-
		PEAK	-	-
		TRUE PEAK	-	-
		VU + PEAK	-	-
		VU + TRUE PEAK	-	-
		CUSTOM	-	-
		LOUDNESS	-	-
		CUSTOM ATTACK	0 TO 20 ms (10 is the Default)	-
		CUSTOM DECAY	0.1 TO 5.0 SECONDS (0.1 increment (1.5 is the Default)	-
		LOUDNESS INTEGRATION	1, 5, 10, 30, 60 SECONDS (5 Seconds is the Default)	-
	PEAK HOLD	**PEAK HOLD TIME**	OFF	-
			1 TO 10 SECONDS	-
			INFINITE	-
		RESET PEAK	-	-
	METER LABELS	STEREO PAIRS	-	-
		SMPTE 320M	-	-
		CUSTOM		

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

METER SETUP (CONT)	**METER LABELS (CONT)**	**EDIT CUSTOM LABELS**	**METER 1 TO 8**	RENAME SCREEN
	LISSAJOUS SETUP	**PERSISTENCE**	1 TO 10 (5 is the Default)	-
		ATTACK	1 TO 10 (5 is the Default)	-
		AGC	OFF (Default)	-
			ON	-
	CONFIGURE PHASE BAR(S)	**POLARITY**	NORMAL (Default)	-
			REVERSE	-
		DAMPING	FAST, 1 TO 10, SLOW (FAST is Default)	-
	LFE OFFSET	NONE (Default)	-	-
		-10 dB	-	-
	CINESOUND DIRECTION	OUTWARD (Default)	-	-
		INWARD	-	-
	AUDIO MARKERS	**DISPLAY**	OFF	-
			ON	-
		POSITION	-50 dB TO +12 dB (0 is the Default)	-
AES VALIDITY BIT	ENABLED (Default)	-	-	-
	DISABLED	-	-	-
OUTPUT PREFERENCES	**MUTE UNSELECTED INPUTS**	OFF (Default)	-	-
		ON	-	-
	AES OUTPUTS	OFF (Default)	-	-
		ON	-	-
	DOLBY OUTPUT (TVM/VTM A3-OPT 3/5 TL only)	OFF (Default)	-	-
		PAIR 1	-	-
		PAIR 2	-	-
		PAIR 3	-	-
		PAIR 4	-	-
		PAIR 5	-	-
		PAIR 6	-	-
		PAIR 7	-	-
		PAIR 8	-	-

(Table continues on next page)

Table 3-13. Audio Setup Menu with TVM/VTM A3-OPT 3/5 TL (*continued*)

	ANALOG OUTPUT LEVEL	**ANALOG INPUT**	-50 dB (MUTE) TO +6 dB (0 is the Default)	-
		DIGITAL INPUT	-50 dB (MUTE) TO +6 dB (0 is the Default)	-

Table 3-14. Loudness Metering and Display Setup Menu with TVM/VTM A3-OPT 3/5 TL

LOUDNESS SETUP	**Mode**	ATSC A/85 (Default)	-	-
		EBU R 128	-	-
		Custom	-	-
	Units	LKFS (Default)	-	-
		LU	-	-
	ATSC A/85 Mode Setup	**Program**	Use Relative Gating	Off, On (Off is the default)
			Relative Gating Value	-20 to -6 Rel (-8 Rel is the default)
		Loudness Integration Time	1 to 60 seconds (10 seconds is the default)	-
		Max Hold Time	1 to 60 seconds, Infinite (Infinite is the default)	-
		Range	Relative Gating Active	On (Fixed)
			Relative Gating Value	-20 Rel (Fixed)
		Target Loudness	Level	-31 LKFS to -1 LKFS (-24 LKFS is the default)
			High Level Above Target	1 LU to 10 LU (2 LU is the default)
			Low Level Below Target	1 LU to 10 LU (2 LU is the default)
		Absolute Gating	-70 LKFS to -50 LKFS (-70 LKFS is the Default)	-
	EBU R 128 Mode Setup	**Program**	Use Relative Gating	On (Fixed)
			Relative Gating Value	-8 Rel (Fixed)
		Short Term Integration Time	3 seconds (Fixed)	-
		Max Hold Time	1 to 60 seconds, Infinite (Infinite is the default)	-
		Range	Relative Gating Active	On (Fixed)
			Relative Gating Value	-20 Rel (Fixed)

(Table continues on next page)

Table 3-14. Loudness Metering and Display Setup Menu with TVM/VTM A3-OPT 3/5 TL (*Continued*)

LOUDNESS SETUP (CONT)	**EBU R 128 Mode Setup (CONT)**	**Target Loudness**	Level	-23 LKFS (Fixed)
			High Level Above Target	1 LU to 10 LU (1 LU is the default)
			Low Level Below Target	1 LU to 10 LU (1 LU is the default)
		Absolute Gating	-70 LKFS (Fixed)	-
	Custom Mode Setup	**Program**	Use Relative Gating	Off, On (On is the default)
			Relative Gating Value	-20 to -6 Rel (-8 Rel is the default)
		Loudness Integration Time	1 to 60 seconds (3 seconds is the default)	-
		Max Hold Time	1 to 60 seconds, Infinite (Infinite is the default)	-
		Range	Relative Gating Active	Off, On (On is the default)
			Relative Gating Value	-22 to -18 Rel (-20 Rel is the default)
		Target Loudness	Level	-31 LKFS to -1 LKFS (-23 LKFS is the default)
			High Level Above Target	1 LU to 10 LU (1 LU is the default)
			Low Level Below Target	1 LU to 10 LU (1 LU is the default)
		Absolute Gating	-70 LKFS to -50 LKFS (-70 LKFS is the Default)	-
	Trending Time	-15 seconds to 24 hours (.25 hour is the default)	-	-

Table 3-15. Loudness Bar Setup Menu with TVM/VTM A3-OPT 3/5 TL

LOUDNESS	**ATSC A/85 Mode**	Source	Momentary Loudness (Default)	-
			Short Term Loudness	-
		LU Scale	Top	0 LU to 24 LU (24 LU is the default)
			Bottom	-50 LU to -10 LU (-46 LU is the default)
		LKFS Scale	Top	-20 LKFS to 0 LKFS (0 LKFS is the default)
			Bottom	-70 LKFS to -30 LKFS (-70 LKFS is the default)
	EBU R 128 Mode	Source	Momentary Loudness (Default)	-
			Short Term Loudness	-
		Scale	EBU +9 (Default)	
			EBU +18	
			Full Scale	
	Custom Mode	Source	Momentary Loudness (Default)	-
			Short Term Loudness	-
		LU Scale	Top	0 LU to 24 LU (23 LU is the default)
			Bottom	-50 LU to -10 LU (-47 LU is the default)
		LKFS Scale	Top	-20 LKFS to 0 LKFS (0 LKFS is the default)
			Bottom	-70 LKFS to -30 LKFS (-70 LKFS is the default)

Table 3-16. Audio Alarms Menu

ALARM REPORTING SETUP	MATRIX SCREEN	-	-
PEAK AUDIO	**ANALOG**	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-
		ENABLE CH 7	-
		ENABLE CH 8	-
		ANALOG LEVEL	-6 TO 24 dBu (24 dBu is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
	DIGITAL	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-
		ENABLE CH 7	-
		ENABLE CH 8	-
		DIGITAL LEVEL	-30 TO 0 dBFS (-10 dBFS is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
PHASE (by pair)	ENABLE PAIR 1	-	-
	ENABLE PAIR 2	-	-
	ENABLE PAIR 3	-	-
	ENABLE PAIR 4	-	-
	VALUE	0 TO 178 DEGREES	-
	DURATION	0 TO 60 SECONDS (2 Seconds Default)	-
LOSS OF SOUND	**ANALOG**	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-

(Table continues on next page)

Table 3-16. Audio Alarms Menu (*continued*)

LOSS OF SOUND (CONT)	**ANALOG (CONT)**	ENABLE CH 7	-
		ENABLE CH 8	-
		ANALOG LEVEL	-50 TO 0 dBu (-50 dBu is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
	DIGITAL	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-
		ENABLE CH 7	-
		ENABLE CH 8	-
		DIGITAL LEVEL	-60 TO 0 dBFS (-60 dBFS is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
LOSS OF AES DATA	ENABLE INPUT 1	-	-
	ENABLE INPUT 2	-	-
	ENABLE INPUT 3	-	-
	ENABLE INPUT 4	-	-
	ENABLE INPUT 5*	-	-
	ENABLE INPUT 6*	-	-
	ENABLE INPUT 7*	-	-
	ENABLE INPUT 8*	-	-
	DURATION	0 TO 60 SECONDS (2 Seconds Default)	-
LOSS OF EMBEDDED DATA	ENABLE GROUP 1 PAIR 1	-	-
	ENABLE GROUP 1 PAIR 2	-	-
	ENABLE GROUP 2 PAIR 1	-	-
	ENABLE GROUP 2 PAIR 2	-	-
	ENABLE GROUP 3 PAIR 1	-	-
	ENABLE GROUP 3 PAIR 2	-	-

***NOTE**: For A3-OPT 3, 4, and 5 when AES expansion is installed.

(Table continues on next page)

Table 3-16. Audio Alarms Menu (*continued*)

LOSS OF EMBEDDED DATA (CONT)	ENABLE GROUP 4 PAIR 1	-	-
	ENABLE GROUP 4 PAIR 2	-	-
	DURATION	0 TO 60 SECONDS (2 Seconds Default)	-
AES/EBU PHASE	ENABLE INPUT 1	-	-
	ENABLE INPUT 2	-	-
	ENABLE INPUT 3	-	-
	ENABLE INPUT 4	-	-
	ENABLE INPUT 5*	-	-
	ENABLE INPUT 6*	-	-
	ENABLE INPUT 7*	-	-
	ENABLE INPUT 8*	-	-
	REFERENCE INPUT	INPUT 1 TO 4 (INPUT 1 Default)	-
	THRESHOLD	5% or 25% (5% is Default)	-
	DURATION	0 TO 60 SECONDS (2 Seconds Default)	-
CONTINUOUS TONE	ENABLE CH 1	-	-
	ENABLE CH 2	-	-
	ENABLE CH 3	-	-
	ENABLE CH 4	-	-
	ENABLE CH 5	-	-
	ENABLE CH 6	-	-
	ENABLE CH 7	-	-
	ENABLE CH 8	-	-
	THRESHOLD	1 TO 20 dB (5 dB is Default)	-
	DURATION	0 TO 60 SECONDS (2 Seconds is Default)	-

***NOTE**: For A3-OPT 3, 4, and 5 when AES expansion is installed.

(Table continues on next page)

Table 3-16. Audio Alarms Menu (*continued*)

DIGITAL AUDIO CLIP	ENABLE CH 1	-	-
	ENABLE CH 2	-	-
	ENABLE CH 3	-	-
	ENABLE CH 4	-	-
	ENABLE CH 5	-	-
	ENABLE CH 6	-	-
	ENABLE CH 7	-	-
	ENABLE CH 8	-	-
	SENSITIVITY	1 TO 100 CES (50 CES is Default)	-
	DURATION	0 TO 60 SECONDS (2 Seconds is Default)	-
DIGITAL AUDIO MUTE	ENABLE CH 1	-	-
	ENABLE CH 2	-	-
	ENABLE CH 3	-	-
	ENABLE CH 4	-	-
	ENABLE CH 5	-	-
	ENABLE CH 6	-	-
	ENABLE CH 7	-	-
	ENABLE CH 8	-	-
	SENSITIVITY	1 TO 100 CES (50 CES is Default)	-
	DURATION	0 TO 60 SECONDS (2 Seconds is Default)	-
AES/EBU V BIT	ENABLE INPUT 1	-	-
	ENABLE INPUT 2	-	-
	ENABLE INPUT 3	-	-
	ENABLE INPUT 4	-	-
	ENABLE INPUT 5*	-	-
	ENABLE INPUT 6*	-	-
	ENABLE INPUT 7*	-	-
	ENABLE INPUT 8*	-	-
	DURATION	0 TO 60 SECONDS (2 Seconds is Default)	-

NOTE: For A3-OPT 3, 4, and 5 when AES expansion is installed.

(Table continues on next page)

Table 3-16. Audio Alarms Menu (*continued*)

EMBEDDED V-BIT DATA	ENABLE GROUP 1 PAIR 1	-	-
	ENABLE GROUP 1 PAIR 2	-	-
	ENABLE GROUP 2 PAIR 1	-	-
	ENABLE GROUP 2 PAIR 2	-	-
	ENABLE GROUP 3 PAIR 1	-	-
	ENABLE GROUP 3 PAIR 2	-	-
	ENABLE GROUP 4 PAIR 1	-	-
	ENABLE GROUP 4 PAIR 2	-	-
	DURATION	0 TO 60 SECONDS (2 Seconds Default)	-
LOW AUDIO	**ANALOG**	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-
		ENABLE CH 7	-
		ENABLE CH 8	-
		ANALOG LEVEL	-50 TO 0 dBu (-50 dBu is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
	DIGITAL	ENABLE CH 1	-
		ENABLE CH 2	-
		ENABLE CH 3	-
		ENABLE CH 4	-
		ENABLE CH 5	-
		ENABLE CH 6	-
		ENABLE CH 7	-
		ENABLE CH 8	-
		DIGITAL LEVEL	-60 TO 0 dBFS (-60 dBFS is Default)
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)

(Table continues on next page)

Table 3-16. Audio Alarms Menu (*continued*)

BCH	ENABLE	-	-
	DURATION	0 TO 60 SECONDS (2 Seconds is Default)	-
DOLBY FORMAT CHANGE (A^3-OPT 4 and 5)	ENABLE	-	-
	FORMAT	**DOLBY E**	5.1
			5.1+2 (Default)
			5.1+2x1
			4x2
			3x2
			8x1
			6x1
		DOLBY D	3/2L
			3/2
			3/1
			2/0
			2/0
			2/1
Loudness	**High Level Above Target**	ENABLE	-
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)
	Low Level Below Target	ENABLE	-
		DURATION	0 TO 60 SECONDS (2 Seconds is Default)

Audio Setup Menu

The Audio Setup menu is used to set the audio.

Configure Inputs

The configure inputs menu is used to select the audio inputs A/B or C/D.

Audio Type

The Audio Type menu is used to one of five audio types. The five audio types are:

- **ANALOG**
- **AES/EBU** - A digital audio standard established jointly by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU).

- **EMBEDDED** - Digital audio information multiplexed onto a serial digital data stream. Up to sixteen channels can be multiplexed on a single stream of SDI video, minimizing cabling and routing requirement.
- **DOLBY AES** - Dolby encoded audio information from a digital audio input. (Dolby option required)
- **DOLBY EMB. (EMBEDDED)** - Dolby Encoded audio information multiplexed onto a serial digital data stream. Up to eight channels can be multiplexed on a single data stream. (Dolby option required)

Audio Display

The TVM/VTM instrument is capable of displaying analog or digital audio. To take advantage of this flexibility, use the AUDIO SETUP menu to select specifications unique to the studio environment.

Configure the audio display type and parameters using the Audio Setup CONFIGURE INPUT A to D submenu. Audio can be displayed as:

- **2 Channels**: One vertical 2 channel bar graph with 1 Lissajous and 1 Phase bar
- **4 Channels**: Two vertical 2 channel bar graphs (for a total of 4 channels) with 2 Lissajous and 2 Phase bars
- **6 Channels**: Three vertical 2 channel bar graphs (for a total of 6 channels) with 3 Phase bars or CineSound 5.1 with 2 Phase bars
- **8 Channels**: Four vertical 2 channel bar graphs (for a total of 8 channels) with 4 Phase bars or CineSound 5.1+AUX, 6.1, or 7.1 with up to three phase bars.
- Lissajous: selectable as Soundstage and X-Y displays.
- **Loudness** (TVM/VTM A3-OPT 3/5 TL only): Enables and disables the loudness display. See loudness setup on page 3-50, for more information on Loudness.

Utilizing two or four channels will display only the vertical meters. Input assignments, scaling, input levels, and response can also be modified using the AUDIO SETUP menu.

NOTE: Channels 1 to 8 can be selected for each audio meter channel bar when the ANALOG audio type is selected. Channels 1 to 16 can be selected for each audio meter channel bar when AES/EBU, EMBEDDED, DOLBY® AES, or DOLBY® EMBEDDED is selected.

Audio Input and Output Mapping

NOTE: If the software does not recognize the second set of four additional AES inputs, inputs 9 through 16 are grayed out and not able to be selected.

The Audio Input and Output Mapping is used to assign the Meter to the input. When selected, the MATRIX screen, shown in **Figure 3-15**, for Analog, AES/EBU, or Embedded appears. Press the NAVIGATION buttons to move around the Matrix, and press ENT button to assign an input to a meter. Separate Mapping schemes can be made for the BAR TO INPUT MAP and ANALOG OUTPUT MAP. Only one input can be assigned to a meter, but multiple meters can be assigned to an input.

Figure 3-15. Audio Input and Output Mapping Screen (Bar To Input Map)

Dolby Setup

Dolby can be configured in the Setup menu. Within each Dolby® code is a list of channel assignments. The Dolby Main Output Channel Assignment is shown in **Table 3-17**.

Table 3-17. Dolby® Main Output Channel Assignment

Dolby E Program Config or Dolby Digital coding mode	Ch 1	Ch 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8
5.1 + 2	0L	0R	0C	0LFE	0Ls	0Rs	1L	1R
5.1 + 2x1	0L	0R	0C	0LFE	0Ls	0Rs	1C	2C
2x4	0L	0R	0C	0S	1C	1S	1L	1R
4+2x2	0L	0R	0C	0S	2L	2R	1L	1R
4+2+2x1	0L	0R	0C	0S	2C	3C	1L	1R
4+4x1	0L	0R	0C	0S	3C	4C	1C	2C
4x2	0L	0R	2L	2R	3L	3R	1L	1R
3x2+2x1	0L	0R	2L	2R	3C	4C	1L	1R
2x2+4x	0L	0R	2C	3C	4C	5C	1L	1R
2+6x1	0L	0R	3C	4C	5C	6C	1C	2C
8x1	0C	1C	2C	3C	4C	5C	6C	7C
5.1	0L	0R	0C	0LFE	0Ls	0Rs	none	none
4+2	0L	0R	0C	0S	none	none	1L	1R
4+2x1	0L	0R	0C	0S	none	none	1C	2C
3x2	0L	0R	2L	2R	none	none	1L	1R
2x2+2x1	0L	0R	2C	3C	none	none	1L	1R
2+4x1	0L	0R	3C	4C	none	none	1C	2C
6x1	0C	1C	2C	3C	4C	5C	none	none
4	0L	0R	0C	0S	none	none	none	none
2x2	0L	0R	none	none	none	none	1L	1R
2+2x1	0L	0R	none	none	none	none	1C	2C
4x1	0C	1C	2C	3C	none	none	none	none
3/2L (Dolby Digital)	0L	0R	0C	0LFE	0Ls	0Rs	none	none
3/2 (Dolby Digital)	0L	0R	0C	none	0Ls	0Rs	none	none
2/2L (Dolby Digital)	0L	0R	none	0LFE	0Ls	0Rs	none	none
2/2 (Dolby Digital)	0L	0R	none	none	0Ls	0Rs	none	none
3/1L (Dolby Digital)	0L	0R	0C	0LFE	0S	none	none	none
3/1 (Dolby Digital)	0L	0R	0C	none	0S	none	none	none
2/1L (Dolby Digital)	0L	0R	none	0LFE	0S	none	none	none
2/1 (Dolby Digital)	0L	0R	none	none	0S	none	none	none
3/0L (Dolby Digital)	0L	0R	0C	0LFE	none	none	none	none
3/0 (Dolby Digital)	0L	0R	0C	none	none	none	none	none
2/0 (Dolby Digital)	0L	0R	none	none	none	none	none	none
1/0 (Dolby Digital)	none	none	0C	none	none	none	none	none
1+1 (Dolby Digital)	0C	1C	none	none	none	none	none	none
PCM	0L	0R	none	none	none	none	none	none

Any one of the digital inputs can be routed for Dolby processing. The data derived from the Dolby processing is sent to the meters for display. When selected, the Dolby downmix is decoded on meter 7/8, and the analog output is on 7/8. Other Dolby related configurations are available in the Dolby configuration menu.

Dolby Selections

Dolby® includes Dolby® Digital and Dolby® E technology selections. One to eight output programs can be selected in the AUDIO SETUP\CONFIGURE AUDIO\DOLBY SETUP\OUTPUT CH MAPPING\PROGRAM SELECT\1 TO 8. These selections are found in the Audio Setup menu on page 4-22.

Six or Eight channels of Dolby E can be selected from the Audio Setup menu. Within each channel is a list of encoded selections.

With the channels defined, an example of an 8-channel configuration shown in the Audio Setup menu is "8x1." This example signifies that eight channels will receive a mono signal.

Dolby Digital channels can also be encoded in the input signal. Each digital code could contain encoded selections. An "L" next to the channel selection indicates a Low Frequency Effect (LFE).

Dolby® D is an AC-3™ encoded signal that uses a maximum of six audio channels. Within each Dolby® Digital channel is a list of output formats. Sample Dolby® Digital channel selections are:

- 3/2L: Contains three front channels (left, center, and right), and two surround sound channels (right surround, left surround). The "L" indicates a Low Frequency Effect.
- 3/2: Contains three front channels (left, center, and right), and two surround sound channels (right surround, left surround).
- 2/2L: Four-speaker configuration consisting of two front speakers and two surround sound speakers. Usually used to simulate sound coming from a phantom center speaker. The "L" indicates a LFE.
- 2/2: Four-speaker configuration consisting of two front speakers and two surround sound speakers. Usually used to simulate sound coming from a phantom center speaker.
- 3/1: Contains three front channels (left, center, and right), and one surround sound channel. If this channel is selected, the same sound is utilized through both surround sound speakers.
- 2/1: Contains two front channels (left and right), and one surround sound channel. If this channel is selected, the same sound is utilized through both surround sound speakers.
- 3/0: Contains three front channels (left, center, and right). No surround sound speakers are utilized.
- 2/0: Contains two front channels (left and right). No surround sound speakers are utilized. This is stereo mode.
- 1/0: Only the center CH speaker is utilized. This is mono.

Dolby Output Mapping is established in Dolby® Digital and Dolby® E channel selections. Each channel selection contains a list of encoded options. The terminology in the Dolby Output Mapping is defined as follows:

- Low Frequency Effects (LFE): provides a deep bass effect.
- Dolby AC-3: Audio coding for multiple or single channel transmission.
- Dolby Digital: Digital audio format using Dolby AC-3.
- 5.1: Surround Sound Configuration. The "5" consists of three front channels (left, center, and right), and two surround sound channels (right surround, left surround). The ".1" provides the LFE.

- Lt and Rt: Left total and right total channels for surround sound setup.
- Lo and Ro: Left only and right only sound channels for stereo use.
- L: Left channel
- C: Center channel
- R: Right channel
- Ls: Left surround channel
- Rs: Right surround channel
- L+C: Left and center channels
- L+R: Left and right channels
- #/#: The number of front speakers to the number of surround sound speakers

Dolby Pulldown Mode

Pulldown Mode is a decoding method for Dolby® E when a video tape recorder operates at lower than 30 frames per second. This mode should only be enabled in conjunction with a downmix bitstream. If Pulldown mode is enabled, and there is no downmix bitstream detected, the audio will become distorted.

The Dolby® E encoder and decoder must have Pulldown mode enabled in order for Dolby® E with a downmix bitstream to function properly. If Pulldown mode is not enabled and Dolby® E with a downmix bitstream operates at less than 30 frames per second, Dolby® E cannot be decoded.

AUX Channel Dynamic Range Control Mode

Auxiliary Channel Dynamic Range Mode is used to determine the decoder dynamic range compression. The Emulation selections are RF and LINE.

- **Line Mode**: Handles a lighter compression rate than RF mode. This selection is used mostly with consumer decoders. Adjustments of low level and high level scaling of dynamic range compression is acceptable.
- **RF Mode**: Handles a heavy compression rate. This selection is used mostly with consumer decoders, and delivers the program material through the RF input on a television.

Dolby Dial Norm

Dial Norm is the dialogue normalization parameter in the Dolby® E bitstream. For a Dolby® E signal, the bitstream carries the Dolby® Digital Dial Norm parameter associated with Dolby® E PGM 1. The remaining PGMs carry the Dolby® Digital Dial Norm parameters associated with their respective Dolby® E programs.

Pro Logic

The Pro Logic mode is a manual selection that is enabled or disabled in the AUDIO SETUP\DOLBY SETUP\DOLBY PRO-LOGIC MODE menu.

The Dolby Pro-Logic function decodes an input signal into a left, right, center, and two mono surround sound channels. The surround sound channels duplicate a single surround channel sound for the analog output.

The display follows the mapping of the surround sound outputs of Dolby D. The duplicated Pro Logic surround sound channel is displayed on two vertical bars or two surround CineSound bars.

The LFE channel does not display any meter movement when Pro Logic mode is enabled. When vertical meter bars are selected, the LFE channel is shown with the center channel as a meter pair

Meter Setup

The Meter Setup submenu is used to select the response, ballistics, and other meter features.

Reference Level Analog

The Reference Level Analog setting is used to set the reference level on the meters for an analog signal. Content below this setting is green. Content above this setting is yellow.

Reference Level Digital

The Reference Level Digital setting is used to set the reference level on the meters for a digital signal. Content below this setting is green. Content above this setting is yellow.

Analog and Digital Scales

The Analog and Digital Scales submenus are used to determine the type of scale that appears on the Audio meter display. Custom dBFS and Custom dB can customize the top and bottom of the dBFS or dB scales.

Meter Response

Ballistics specifications are shown in **Table 3-18**. These specifications describe meter scale markings and both attack and decay times for meter movement.

Table 3-18. Ballistic Specifications with Attack and Decay

Ballistic Name	Standard	Attack	Decay
VU	IEC 268-17	300 ms	300 ms
PEAK	IEC 268-10	10 ms	1.7 sec
TRUE PEAK	IEC 268-10	0 ms	1.7 sec
LOUDNESS	IEC 60804	Averaged over time 5 seconds to 60 secs	Averaged over time 5 seconds to 60 secs
CUSTOM	N/A (VARIABLE)	0 to 20 ms	0.1 to 5.0 sec

The audio scales and ballistics are based on the IEC 268-10, IEC 268-17, and IEC 60804 standards. These standards describe meter scale markings and both attack and decay times for meter movement.

The following meter responses can be selected:

- VU (NORMAL)

- PEAK
- TRUE PEAK (5x oversampling for enhanced true peak detection on VTM/TVM-A3-OPT 3/5 TL)
- VU + PEAK
- VU + TRUE PEAK
- CUSTOM
- LOUDNESS

*__NOTE__: PEAK HOLD TIME is a user-selectable duration value of 1 to 10 seconds or infinite. The duration only applies to the hold time of the PEAK value, not the attack or decay time.

CUSTOM is used to manually set the attack and decay times. The Attack duration can be set from 0 to 20 ms. The Decay duration can be set from 0.1 to 5.0 sec in 0.1 second increments.

LOUDNESS INTEGRATION TIME can be set to 5, 10, 30, or 60 seconds.

PK (Peak) Hold

PK (PEAK) HOLD TIME is a user-selectable duration value of OFF, 1 to 10 seconds, or infinite. The duration only applies to the hold time of the PEAK value, not the attack or decay time. RESET PEAK HOLD manually resets the Peak Hold values.

Meter Labels

The Meters Labels menu is used to select the audio mapping scheme for the selected input. Only the Vertical Bar Meter Labels can be customized. When the CineSound display is selected, the audio inputs follow a SMPTE ST 2035:2009 Case 11c mapping scheme. For vertical meters only, the SMPTE ST 2035:2009 Case 11c meter label-mapping scheme can be changed to a stereo pair-mapping scheme.

Lissajous Setup

The Lissajous display is a display of the amplitude and phase relationships between two input signals. The Lissajous Setup is used to set the persistence and attack, and enable or disable Automatic Gain Control (AGC).

AGC, when enabled, is used to automatically adjust gain setting in the Lissajous and Phase displays. Otherwise, the Lissajous display contains a fixed gain mode. AGC keeps the lissajous pattern within the bounds of the signal levels from –50 dBFS to 0 dBFS.

Configure Phase Bar(s)

The phase bar monitors the instantaneous phase relationship between two audio channels. A properly phased stereo pair produces a phase pointer (yellow mark framed in black) that moves within the green zone, whereas a reversed channel produces a pointer that moves within the red zone. The phase bar polarity can be set to Normal or Reverse. The Phase Bar Damping can be set from FAST, 1 to 10, and SLOW.

LFE Offset

LFE Offset adjusts the LFE by –10 dB when enabled. LFE Offset only occurs when CineSound is displayed.

CineSound Direction

The default meter movement for the CineSound display is from the center outward, but it can be reversed using the CineSound Direction submenu. Select INWARD to reverse the meter movement.

Audio Markers

Adjustable markers can be placed in the audio meters to show a specific critical level. In addition, alarms can be activated to monitor peak levels, phase differences, loss of sound, and loss of data. The adjustable markers are selected in the Audio Markers submenu.

AES Validity Bit

The AES Validity Bit is used to detect PCM (pulse code modulation) audio or non-PCM audio. Non-PCM audio can include Dolby or the digital data.

Output Preferences

The Output Preferences is used to determine what is output from the audio option. It can also mute the inputs and determine the analog output level.

Mute Unselected Inputs

The Mute Unselected Inputs menu item, when set to ON, is used to mute any outputs, selected in the ANALOG AUDIO INPUT TO OUTPUT MAP matrix, that are not used in the audio display assignment selection. If outputs are assigned independently from meters, the Mute Selected Inputs mutes outputs 3 to 8 when two channels are displayed, 5 to 8 when four channels are displayed, and 7 to 8 when six channels are displayed.

AES Outputs

The AES Outputs menu is used to configure the AES/I/O as outputs. AES I/O 1-4 will derive the AES outputs from the analog, AES, or Embedded source inputs (this also includes Dolby formatted sources when the Dolby options are installed).

The Audio option AES output selection uses these additional selections to determine the source channels to route to an AES output:

- Input selection (A, B, C, D)
- Selected AUDIO TYPE
- Selected input audio type ANALOG OUTPUT MAP settings

When the TVM/VTM-A3-OPT 5 is installed and the Dolby format is selected, all 4 AES I/O will have decoded pairs present on the outputs corresponding to the meters

with output 4 (CH 7/8). CH 7/8 is displayed as either decoded pair 4 or downmix. Downmix is selected in Dolby menu (DOWNMIX SELECT\ON). When the TVM/VTM-A3-OPT 5TL is installed and the Dolby format is selected, all four AES outputs will have decoded pairs present on the outputs corresponding to the meters. Output 4 (CH 7/8) is displayed as either decoded pair 4, Downmix, or one of the other audio pairs as selected in the Dolby menu AUX Source.

Dolby Output (Digital Monitor Audio Output)

The Digital Monitoring Output is always enabled. The Digital Monitor Audio Output is used to monitor channels 1/2 in the AES format corresponding to analog, AES or Embedded channels 1/2 (dependent upon how they are assigned in I/O Mapping matrix for the selected audio format).

When the Dolby® OUTPUT is set to ON, a copy of the selected stream from the monitored AES or embedded channel will be present on the Digital Audio output.

Analog Output Level

The analog output audio level can be adjusted from -50 dB to +6 dB for analog and digital inputs independently.

The default output level for a -20 dBFS digital input produces a +4 dBm analog output level (600Ω). For example, when applying a gain adjustment of +6 dB to the output with a -20 dBFS input signal, the audio output level will be +10 dBm into a 600Ω termination. The Audio Output Level adjustment default is 0 dB.

Dolby Metadata Display (Option Dependent)

Press and hold the OPT button to access the OPT pop-up menu. Within the OPT pop-up menu is the Dolby Metadata display selection. Metadata is Dolby specific information found in the input audio stream that is used to configure encoders that will transmit the Dolby Digital (AC-3) information to audio decoders.

When the metadata information appears on the display, use the UP and DOWN NAVIGATION buttons to page through the metadata list. Press the RIGHT NAVIGATION button to move to the next program list. Press the LEFT NAVIGATION button to move to the previous program list. The metadata is read from the Dolby stream and cannot be changed.

1. Time Stamp
2. Program Config
3. Program
4. Data Rate
5. Bitstream Mode
6. Channel Mode
7. LFE Channel (Enabled/Disabled)
8. Dolby Surr (Surround) Mode
9. Dialogue Level
18. Lo/Ro Surround Downmix
19. Lo/Ro Center Downmix
20. Pref. Stereo Downmix
21. Dolby Surr (Surround) Ex. Mode
22. A/D Converter Type
23. Original Bitstream
24. Copyright Bit
25. DC Filter
26. Lowpass Filter

10. Center Downmix Level
11. Surround Downmix Level
12. Audio Prod (Production) Information
13. Room Type
14. Mix Level
15. RF Overmod Protection
16. Lt/Rt Surround Downmix
17. Lt/Rt Center Downmix
27. LFE Lowpass Filter
28. Surround Attenuation
29. Surround Phase Shift
30. Line Mode Comp Gain
31. Dynamic Range Gain
32. RF Mode Comp Gain
33. Compression Gain

A Dolby Metadata display diagram is shown in **Figure 3-16** and described in **Table 3-19**. The diagram illustrates the general location for the various waveform display fields.

Figure 3-16. Dolby Metadata Display Diagram

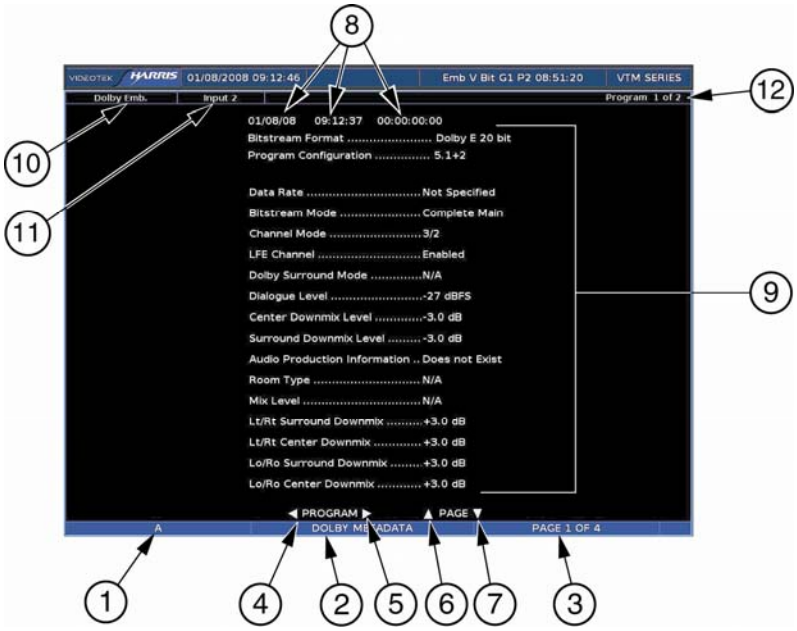


Table 3-19. Description of Dolby Metadata Display Diagram

Field Identifier	Field information	Nomenclature
1	Input	Displays the user-configurable source IDs for the input and routers.
2	Display Label	Shown as Dolby Metadata
3	Page Information	Shown as page X of Y where X is the page number and Y is the total number of pages.
4	Paging Information	Displays ◄ = Previous program.
5	Paging Information	Displays ► = Next program
6	Paging Information	Displays ▲ = PAGE UP.

(Table continues on next page)

Table 3-19. Description of Dolby Metadata Display Diagram (continued)

Field Identifier	Field information	Nomenclature
7	Paging Information	Displays ▼ = PAGE DOWN.
8	Date, Internal Time, Selected Time Code, time stamp	Date is shown as month/day/year, internal Time is shown as hour: minute: seconds, and time code is shown as hour: minute: seconds: frame.
9	Metadata Information	Supplied by the A3-OPT 5 board. The A3-OPT 4 shows some metadata programs, but not all.
10	Audio Type	Displayed as Analog, AES, or Embedded, Dolby AES, Dolby Embedded
11	Dolby Display INPUT	The input selected in the AUDIO SETUP\CONFIGURE INPUT (A to D)\DOLBY SETUP\DISPLAY INPUT menu is the Dolby display input displayed. Dolby inputs are shown as one digital input.
12	Program Information	Shows how many programs are available for the current Dolby format, and to which program the metadata parameters apply.

Embedded Audio Data

When enabled in the OPTION pop-up menu, the Embedded Audio display appears. Each channel is displayed on two pages. The first page is CHANNEL STATUS BIT and the second page is USER BIT. Audio Control Packet data provides the first block of information at the top of the pane. The Audio Control Packet information is embedded at line 9 or 571 (interlaced only) of the horizontal ancillary data for the Y channel.

At the top of the pane DID indicates the audio groups that are embedded as audio, and a "-"indicates the audio group is not present. Also, the channel number for the data displayed is shown.

The remaining Embedded Audio information provided in the Embedded Audio pane are:

- CHANNELS PRESENT indicates all of the active channels by showing the channel number. When the channel is not present, a "-" appears.
- SAMPLING RATE indicates the sampling frequency of the embedded audio.
- FORMAT indicates the professional or consumer audio format.
- AUDIO DATA indicates if the data received is audio (shown with YES) or not audio (shown with NO).
- EMPHASIS indicates No, NA, TC, and J17. No indicates no emphasis. NA indicates that there is no data available or defined. TC indicates the time constant of 50/15 uS. J17 indicates CCITT J.17 (800 HZ insertion loss of 6.5 dB).
- SIGNAL LOCK indicates a lock of the source sampling frequency.
- CHANNEL MODE indicates NA, two channel, 1 channel, primary/secondary, and Stereo. NA indicates that the data value is not available or reserved.
- RESOLUTION indicates 20 or 24 bit audio packets.

- The CHANNEL STATUS BIT/USER BIT shows all 192 bits of information by byte. Channel status bit/User Bit information analyzes the bits, decodes the information, and displays the selected data.

When the Embedded Audio metadata information appears on the display, use the UP and DOWN NAVIGATION buttons to scroll through the audio data. Press the RIGHT NAVIGATION button to select the next channel. Press the LEFT NAVIGATION button to select the previous channel.

Audio Alarm Descriptions

The Audio Alarms menu contents are listed below.

Peak Audio

The Peak Audio alarm occurs when the peak audio level exceeds the adjustable limit for a period in excess of the duration setting.

Phase

The Phase alarm occurs when the phase difference between any audio pair exceeds an adjustable range for a period in excess of the duration setting. Four audio pairs can be enabled. This is a global setting for all audio pairs.

Loss of Sound

The Loss of Sound alarm occurs when the peak amplitude falls below an adjustable ANALOG or DIGITAL LEVEL for a period in excess of the duration setting. This alarm is valid for the displayed input (analog, AES/EBU, or embedded). The alarm is global and independent of the scale type or input format.

Loss of AES Data

The Loss of Data alarm monitors the AES/EBU data stream. The alarm occurs when a loss of AES data is detected in the displayed audio for a period in excess of the duration setting.

Loss of Embedded Data

The Loss of Embedded Data alarm monitors the Embedded data stream. The alarm occurs when a loss of embedded data is detected in the displayed audio for a period in excess of the duration setting.

AES/EBU Phase

The AES/EBU Phase alarm compares the alignment of the selectable Reference Input (1 to 8) data to the displayed AES/EBU input data. The alarm occurs when the alignment exceeds the selected threshold for a period in excess of the duration setting.

Continuous Tone

The Continuous Tone alarm occurs when a continuous sound level is present for a period in excess of the duration setting.

Digital Audio Clip

The Digital Audio Clip alarm occurs when the digital audio is at a maximum level for a period in excess of the duration setting. The Digital Clip indicator appears beside the vertical meter when a Digital Audio Clip alarm occurs. After the alarm has cleared, one second will pass before the Audio Clip indicator disappears. For the VTM/TVM A3-OPT 3/5 TL, the accuracy of the digital clip alarm is 0.1 dB.

Digital Audio Mute

The Digital Mute alarm occurs when the digital audio sample is 0 for a period in excess of the duration settings. The Digital mute indicator appears beside the vertical meter when a Digital Audio Mute alarm occurs. After the alarm has cleared, the Digital mute indicator disappears after one second. This can be enabled per channel.

AES/EBU V-Bit

The V-Bit alarm occurs when V-Bit is not detected in the audio AES source for the specified duration.

Embedded V-Bit

The Embedded V-Bit alarm occurs when V-Bit is not detected in the audio embedded source for the specified duration.

Low Audio (Analog and Digital)

The Low Audio alarm occurs when the peak audio sample does not exceed an the adjustable ANALOG or DIGITAL LEVEL for a period of time in excess of the duration setting. The peak audio sample is an absolute measurement of the audio sample and represents the true audio peak. It is not averaged over time, and can be enabled per channel.

BCH

The BCH alarm occurs when errors are detected in an HD embedded audio packet.

Loudness (VTM/TVM A3-OPT 3/5 TL)

The loudness alarm occurs when loudness exceeds or falls below the adjustable threshold for a period in excess of the duration setting.

Section 4 ♦ Troubleshooting

CAUTION — these instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

Cold Starting the TVM/VTM

NOTE: A cold start resets all front panel and Setup menu selections to the factory-default settings. All user settings are lost. See Section 3, "Operation," for the factory-default settings.

If a problem persists after the cables are correctly connected and the unit is set up, perform a Cold Start. Two procedures can cold start the TVM/VTM. Only one procedure needs to be performed to cold start the unit. The first type of cold start procedure is a Power-up Cold Start, as described below. The second type of cold start procedure is a Front Panel Cold Start that is described on page 4-1. The third type of cold start is a Soft Reset that is described on page 4-1.

The Ethernet default settings for the TVM/VTM are:

- IP: 192.0.0.100
- Subnet Mask: 255.0.0.0
- Gateway: 0.0.0.0

Cold Start

The Front Panel Cold Start procedure is a cold starting procedure that does not require the power to be disconnected from the unit. To perform a Front Panel Cold Start:

1. Push and hold the SETUP button, UP/DOWN knob, and RIGHT/LEFT knob. For a minimum of five seconds. The Cold Start message appears on the screen.
2. Once the message appears, the cold start is complete.

Warm Start

The Warm Start procedure is similar to a cold start. This reset will perform a cold start on the unit, but will not erase the Presets from memory. To perform a Warm Start:

1. Push and hold the SETUP button and CURVED ARROW knob for a minimum of five seconds until the Warm Start message appears on the display.
2. Once the message appears, the Warm start is complete.

Problems, Causes, and Solutions

Table 4-1. Problems, Causes, and Solutions

Problem/Symptom	Possible Cause	Solution or Explanation
Audio level reading too low	The input reference level is not correctly set.	Use the SETUP MENU to check the input reference level setting.
Dolby not shown in the menu	Jumper improperly configured.	Configure the jumper on the audio option board to 558 for A3-OPT 4 and 552 for A3-OPT 5.
No sound from input channels	Unselected inputs are muted.	Mute Unselected Inputs is enabled in the AUDIO SETUP\OUTPUT PREFERENCES menu.
CineSound does not appear on the display	2 or 4 Channels are selected in the CONFIGURE INPUT\AUDIO DISPLAY menu.	CineSound can only be displayed with 6 channel or 8 channel selections in the AUDIO DISPLAY menu.
Inputs 9 to 16 are gray in the input AES matrix screen.	A3-4004 not available or connected to the option board.	If available, connect the A3-4004 AES input option to CN12 on the Audio Option card.

If the problem still exists after troubleshooting the TVM, see Appendix B, “Service Support,” for further instructions.

Appendix A ♦ Specifications

Audio Options

Inputs (Analog)	Eight monophonic or four stereo channels, balanced or unbalanced
Maximum Input Level	+24 dBu
Input Connector	37-pin, D-sub, male
Impedance:	> 20kΩ
Inputs (Digital)	Four AES/EBU serial digital pairs with input expansion option to eight. Sixteen embedded audio channels, one Dolby® E or AC-3 stream. For VTM/TVM-A3-Opt 3/5 TL, all AES inputs are sample rate converted to 48 kHz.
Input Connectors	Four or eight, BNC, female
Impedance	75Ω
Outputs (Analog)	Eight monophonic or four stereo channels, balanced or unbalanced, follows selected audio input. Dolby inputs produce a two channel mix down and/or full eight channel decode
Output level	▪ +24 dBu max ▪ +6 to –50 dB adjustable ▪ For digital audio, -20 dBFS produces a +4 dBu analog output level
Output connector	37-pin D-sub, male, shared with inputs
Impedance	10Ω unbalanced or 20Ω balanced, nominal
Signal to noise	100 dB (relative to signal level out of +24 dBu), typical
Outputs (Digital)	4 AES/EBU and one Dolby® Digital, Dolby® E, or AES stream embedded in the selected digital video source
Output connector	Four shared with input
Impedance	75Ω, BNC, female

Specifications are subject to change without notice.

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Appendix B ♦ Service Support

For service and support, telephone the Harris Customer Service Department at **888-534-8246**. If the problem cannot be resolved over the telephone and the instrument must be shipped to Harris for service or repair:

- Obtain a Return Authorization (RA) number from the Harris Customer Service Department.
- Attach a tag to the unit with:
  - Your company name, address, and telephone number
  - The name of the contact person at your company
  - The RA number
  - The unit serial number
  - An explanation of the problem
- To prevent shipping damage, pack the unit the same way Harris had packed it. If possible, use the original packing materials in the original shipping container.
- Ship the unit to:

  Harris Corporation

  Videotek Test and Measurement
  243 Shoemaker Road
  Pottstown, PA 19464-6433
  Attn: RA *xxx* (where *x* is the RA number)

  Email: BCDService@harris.com

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Appendix C ♦ Pinouts

Figure C-1. ANALOG AUDIO IN/OUT 37-pin, Male, D-sub Connector

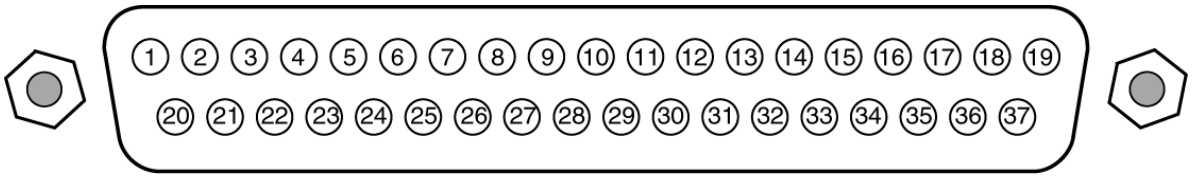

Table C-1. Pinouts for ANALOG AUDIO IN/OUT Connector and Audio Breakout Board

Pinout	Signal		Pinout	Signal
1	Analog input 1 –		**20**	Analog input 1 +
2	Analog input 2 –		**21**	Analog input 2 +
3	Analog input 3 –		**22**	Analog input 3 +
4	GND		**23**	Analog input 4 +
5	Analog input 4 –		**24**	Analog input 5 +
6	Analog input 5 –		**25**	Analog input 6 +
7	Analog input 6 –		**26**	GND
8	Analog input 7 –		**27**	Analog input 7 +
9	Analog input 8 –		**28**	Analog input 8 +
10	GND		**29**	Analog output 1 +
11	Analog output 1 –		**30**	Analog output 2 +
12	Analog output 2 –		**31**	Analog output 3 +
13	Analog output 3 –		**32**	Analog output 4 +
14	Analog output 4 –		**33**	Analog output 5 +
15	Analog output 5 –		**34**	Analog output 6 +
16	Analog output 6 –		**35**	Analog output 7 +*
17	Analog output 7 –*		**36**	Analog output 8 +*
18	Analog output 8 –*		**37**	GND
19	GND			

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Appendix D ♦ Glossary

601 An international standard (ITU-R BT.601) for component digital television. It defines the sampling systems, matrix values, and filter characteristics for digital television.

8 VSB Vestigial sideband modulation with 8 discrete amplitude levels.

16 VSB Vestigial sideband modulation with 16 discrete amplitude levels.

Advanced Television Systems Committee (ATSC) The parent organization that developed, tested and described the form and function of the US digital television formats.

AES/EBU A digital audio standard established jointly by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU).

Artifacts Unwanted visible effects in the picture created by disturbances in the transmission or image processing, such as edge crawl or 'hanging dots' in analog pictures or 'pixelation' in digital pictures.

Aspect Ratio The ratio of horizontal to vertical dimensions. A square has an aspect of 1:1 since the horizontal and vertical measurements are always equal. Current television screen aspect ratios are 4:3 and 16:9.

Asynchronous Serial Interface (ASI) A transmission method adopted by the DVB, and called DVB-ASI. The transmission method allows for the transport of varying data payloads in a constant data stream. The DVB-ASI transport stream rate is 270 Mb/s.

Audio Breakaway Routing video and accompanying audio in separate signal paths.

Audio-Follow Routing video and accompanying audio together in the same signal path.

Auto Trans Automatic transition. The execution of a single wipe or fade from current picture to another picture by way of an automatic device.

Bandwidth The range of frequencies used to transmit information such as picture and sound.

Baseband Video An unmodulated video signal.

Black Also color black, blackburst. A composite color video signal that has the composite sync, reference burst, and a black video signal.

Blanking Processor A circuit which removes sync, burst and blanking from the program video and then replaces it with sync, burst and blanking from the reference input. The process ensures constant sync and burst levels on program video.

Border An electronically-generated picture member which is used in wipes to separate the two video sources used in the wipe. It is of even thickness and has color produced by the matte generator.

Broadcast Legal Encoding video signal parameters to conform to prescribed limits for broadcast. Encoding rules vary by NTSC, PAL, country and broadcast facility.

BTSC Broadcast Television Standards Committee. A US standard for stereo audio encoding in NTSC broadcast television.

CAV Component Analog Video

CES Consecutive Errored Samples

Composite Video A single video signal that includes all color video and timing information. A composite signal includes luminance, chrominance, blanking pulses, sync pulses and color burst information.

Chrominance The color portion of a video signal that represents the saturation and hue. Black, gray and white have no chrominance; color signals have both chrominance and luminance.

CH Chroma

Chrominance/Luminance Delay (C/L Delay) A measurement that indicates the amount to which chrominance and luminance are aligned with respect to each other. A low C/L delay figure can minimize the effects of ghosts or color offset on the received picture.

Clipping The electronic process of shearing off the peaks of either the white or black excursions of a video signal for limiting purposes. Clipping is often performed prior to modulation to limit the signal.

CMRR Common Mode Rejection Ratio

Color Burst The portion of a color video signal which contains a short sample of the color subcarrier. It is used as a color synchronization signal to establish a reference for the color information following it and is used by a color monitor to decode the color portion of a video signal. The color burst acts as both amplitude and phase reference for color hue and intensity. The color oscillator of a color television receiver is phase locked to the color burst.

Composite Sync A signal consisting of horizontal sync pulses, vertical sync pulses and equalizing pulses only.

CRC Cyclical Redundancy Check

Crosspoint An electronic switch, usually controlled by a button on the panel. Control logic will allow for only one crosspoint, for each bus, to be switched "ON" on at a time.

D/A Conversion of digital to analog signals.

DA Distribution Amplifier

Data Element An item of data as represented before encoding and after decoding.

Decoded Stream The decoded reconstruction of a compressed bit stream.

Decibel (dB) A logarithmic measure of the ratio between two powers, voltages, currents, sound intensities, etc. Signal-to-noise ratios are expressed in decibels.

Default A factory preset value or condition.

Demodulator A receiver, such as for television broadcast, cable, and closed circuit applications. A TV demodulator receives and processes off-air or cable RF signals and provides baseband video and audio outputs.

DHCP Dynamic Host Configuration Protocol

Differential Gain A measurement that specifies how much the chrominance gain is affected by the luminance level. Expressed as a percentage showing the largest amplitude change between any two levels, it indicates how much color saturation variance occurs when the luminance level changes.

Differential Phase A peak-to-peak measurement that specifies the extent to which the chrominance phase is affected by the luminance level. Expressed in degrees of subcarrier phase, it indicates how much hue shift occurs with luminance level changes.

Digital Video Broadcasting (DVB) A specific project office of the European Broadcast Union. This group has produced a set of digital broadcasting standards.

DSK Down Stream Key, a keyer which is electronically located after (or down stream from) all other functions of a switcher. The key resulting will appear to be on top of all other pictures from the switcher.

D-VITC Digital Vertical Interval Time Code. Timecode information stored on specific lines in the vertical blanking interval of a television signal.

EAV End of Active Video in component digital systems.

EBU European Broadcasting Union

Editor A device or system which controls video tape recorders, video switchers, and other related devices in order to electronically splice segments of recorded video into a finished production.

EDH Error Detection and Handling. A recommended practice defined in SMPTE RP 165. A system to generate and then detect video data errors in serial digital video systems.

Effects Keyer A keyer which is electronically located in the mix/wipe generator portion of a switcher. The resulting key would appear under the down stream key.

EIA Rack Space or Unit A specific size as designated by the Electronics Industry Association. The rack unit is 19 inches wide, and is 1.75 inches tall. A device which requires 3 EIA rack units is 19 inches wide and 5.25 inches (3x1.75 = 5.25) tall.

Elementary Stream (ES) A generic term for one of the coded video, audio or other variable length bit streams which are packetized to form MPEG-2 transport streams. Consists of compressed data from a single source (audio, video, data, etc.). One elementary stream is carried in a sequence of PES packets with one and only one stream ID.

Embedded Audio Digital audio information multiplexed onto a serial digital data stream. Up to sixteen channels can be multiplexed on a single stream of 601 video, minimizing cabling and routing requirement.

ENG Electronic News Gathering

Encoded Clip Softness In the encoded legalization process, "softness," as applied to encoded clips, refers to the processing of the video at the point of the clip. The clips are applied in YC_BC_R color space. The clip point is either an immediate limit (no softness) or will have a range of values leading to the clip point, all reduced to smooth the clip point to a less immediate limit (softness).

Encoded Legalization Limiting of the luminance and color difference signals such that, once encoded into a composite video signal, the resultant encoded video does not violate the maximum or minimum signal levels as defined by the specific encoding rules. NTSC and PAL video plus various users of these types of video have many varied rules for maximum and minimum encoding limits. Encoded legalization usually calculates first the encoded luminance value and then the corresponding chroma value to make legalization judgements.

Encoded Video A combined single video signal that is constructed from either separate RGB or luminance and two color difference video signals. NTSC, PAL, and SECAM are all examples of encoded video.

Envelope Detection An RF signal detection technique that does not respond to phase variations in the carrier signal, enabling measurement of a transmitter's incidental phase. When used together with synchronous detection, envelope detection helps isolate either video and/or RF as the causes of phase distortion.

External Key Input This is an alternate source for key cut. This is usually a separate external input to a switcher

Fade-thru-Black A production technique which is a two step process. The first step will fade the program video to black. The second step will fade from black to the video selected on the preview bus. This is usually used in major scene transitions.

Fade-to-Black A production technique which simply fades the program video to black and program audio to silent. This is used to end programs and to escape from embarrassing pictures or sounds.

Field A picture or picture portion which is produced within one cycle of vertical synchronization. In interlaced systems, a full picture or frame requires two consecutive fields.

FM Trap A circuit designed to minimize potential interference from strong FM signals in receiving equipment, such as a TV demodulator. For example, an FM trap can attenuate signals between 88-108 MHz to reduce interference on NTSC television channel 6.

Frame A single full resolution picture as viewed in either a video or film system. In the case of interlaced video, two consecutive fields provide all of the information of one frame. In non-interlaced systems, one cycle of vertical synchronization produces a frame. A 60 Hz interlaced system, produces 30 frames of video in one second. A 60 Hz progressive (or non-interlaced) system, produces 60 frames of video in one second. Common frame rates are 24 (film) 25, 29.97, 30, 50, 59.94 and 60.

Frame Synchronizer An electronic device that synchronizes two or more video signals. Using one input as a reference, it locks a second signal to the reference.

Frame Store An electronic method of capturing and storing a single frame of video.

Gamma This term applies to the linearity of the change from black to white. Gamma controls adjust the gray or 50% point of the video either up or down, with the effect of changing the gray level of the video.

Gamut The whole or total of whatever is being addressed. In color space, gamut refers to all colors which are included in a particularly defined color group, such as 601 gamut.

Genlock (Generator Lock) A method of synchronization involving the generation of a video signal that is time and phase locked with another signal.

GPI General Purpose Interface

Headend In a cable TV system, the facilities where program sources (satellite, terrestrial, VTR, local) are received and remodulated for distribution through a cable plant.

High Definition Television (HDTV) High definition television has a resolution of approximately twice that of conventional television in both the horizontal (H) and vertical (V) dimensions and a picture aspect ratio (H to V) of 16:9.

High Level A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

HRC Harmonically-Related Carrier

Hue Color tint

ICPM Incidental Carrier Phase Modulation. A measurement of picture carrier phase distortion (affected by the video signal level) that occurs in the transmitter.

IP Internet Protocol

IRC Incrementally-Related Carrier

I.R.E. Refers to the Institute of Radio Engineers, and is used as a unit of measurement. In NTSC television, 1 volt of signal equals 140 IRE units.

ISP Internet Service Provider

Jitter A deformation of a signal affected by poor synchronization.

Key An effect in television where a selected portion of background video is removed and replaced with another video.

Key Cut In a key effect, this is the video which designates the portion of background video which is removed.

Key Fill In a key effect, this is the video which is used to replace the portion of background video which was removed. This may be the same video as the Key Cut video.

Key Invert In a key effect, this is an electronic action which reverses the polarity of the key cut signal. It makes black appear as white, and white appear as black.

Key Mask In a key effect, it uses a wipe pattern from the wipe pattern generator to restrict the key cut from removing video in a portion of the screen. This requires the use of the wipe pattern generator and the Mask/Preset Size controls.

Key Source Another term which is the same as key cut.

Legalization The modification of serial digital video to conform to analog color space rules, as required by users.

LCD Liquid Crystal Display

LED Light-Emitting Diode

LFE Low Frequency Effects

Lissajous A display of the amplitude and phase relationships between two input signals.

LS Left Surround

LTC Longitudinal Time Code, A SMPTE timecode standard usually recorded onto the linear audio track of a VTR.

Luminance The degree of brightness (black and white portion of the video signal) at any given point in the video image. A video signal is comprised of luminance, chrominance and sync. If luminance is high, the picture is bright and if low the picture is dark. Changing the chrominance does not affect the brightness of the picture.

Main Level A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to standard definition television.

Main Profile A subset of the syntax of the MPEG-2 video coding specification that is supported over a large range of applications. Applications include, MP@HL (Main profile at high level) and MP@ML (Main profile at main level).

Mask/Preset Size Uses the wipe pattern generator in the keyer portion of the effects generator. This is used to adjust the size of a preset pattern or for adjusting the size of a mask to block a portion of the key cut (source) from use in the keyer.

Matte Generator An internal generator which can make any color, is used for border color and may be used for key fill. It is identical to the Color Background Generator, but simply used in other areas of the switcher.

Mbps Megabits Per Second

mV Millivolts

M/E Mix/Effects System

MP@HL Main profile at high level

MP@ML Main profile at main level

MPEG Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, Moving Picture Experts Group.

MPEG-2 Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), and 13818-4 (Compliance).

Multi-Level Effects Applies to any effects generator which can do more than one effect at a time. Typically, a multi level switcher can produce a Key and a Background transition in the same effects generator at one time.

NTSC National Television Systems Committee, the color television system used in the United States, Canada, Mexico and Japan.

NVRAM Nonvolatile RAM

Packet Identifier (PID) A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

Packet A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax.

Packetized Elementary Stream (PES) The data structure used to carry elementary stream data. The packets consist of a header followed by payload data, and a stream is a series of packets which form an elementary stream and have a single stream identification.

PAL Phase Alternation Line; the standard color television system in many European and other countries.

Passive Looping Video and audio signals routed through components, even if power is removed. Signals are not amplified or processed, maintaining transparency.

Pedestal Level An offset used in a video system to separate the active video from the blanking level by maintaining the black level above the blanking level by a small amount.

Pixel A Picture cell or Picture element representing one sample of picture information, such as an individual sample of R, G, B, luminance or chrominance.

Preset Refers to establishing any condition prior to use on the Program output. This term is used in reference to wipe patterns and is often interchanged with Preview.

Preview The video output channel used to view the intended Program results prior to the execution of the next transition.

PRO Audio A transmitted audio channel for talent cueing via Interrupt Foldback (IFB) to ENG vans and remote applications. Some demodulators support PRO audio monitoring.

Program A transport stream combination of a video stream and one or more audio and data streams associated with that video stream. In analog terms, “Program” refers to the Base Band video and audio produced by the final output of a switcher.

Program Association Table (PAT) A list of all programs that are in the ATSC data stream.

Program Map Table (PMT) A listing of all elementary streams that comprise a complete (television) program.

Program Clock Reference (PCR) This is a time reference signal that is placed in MPEG streams for the purpose of time coordinating various data streams.

Program and System Information Protocol (PSIP) Information sent out as part of an ATSC transport stream which lists all of the video, audio, data and program information contained in the stream. This is the "TV guide" for a given stream.

Progressive Scanning Also non-interlaced. A system of video scanning where lines of a picture are transmitted consecutively, such as with VGA monitor displays.

Push-push Toggle Switch An electro-mechanical device which, when pushed, alternates the condition of the switch. Push once, it's off, push again, it's on.

Quadrature Output An output in a television demodulator used for measuring Incidental Carrier Phase Modulation (ICPM) in a transmitter.

QPSK Quadrature Phase Shift Keying, typically used by satellite downlinks.

QAM Quadrature Amplitude Modulation, the technique used by cable TV systems (64-QAM and 256-QAM) to remodulate signals for distribution in a cable plant.

RGB Legalization Limiting of luminance and color difference video signals such that, once transcoded into RGB component video signals, the resultant video does not violate the maximum or minimum signal levels as defined by component video level rules. Typically, the maximum value for R, G, or B is 700 mV, and the absolute minimum value for any of these signals is 0 mV.

Reclocking The process of regenerating digital data with a clock recovered from the input data.

Resolution A measure of the finest detail that can be seen, or resolved, in a reproduced image.

RS Right Surround

RS-422 Recommended Standard number 422, an E.I.A. standard which describes a type of data interchange. Television products use this standard as its communication format between the electronics frame and editors, control panel and computers. An RS-422 line may be extended up to 1,000 feet (304m).

Sampling Process by which an analog signal is sampled to convert the analog signal to digital.

SAP Secondary Audio Program, used in television broadcast for second language broadcasting, simulcasting, and separate audio programming.

Saturation Color intensity

SAW Filter Surface Acoustic Wave filter

Segment Error Rate (SER) A calculated average of uncorrected transport stream packets vs. total packets as accumulated over a designated period of time.

Signal to Noise Ratio -Analog (SNR) A measurement of the noise level in a signal expressed in dB (decibels) as a ratio of between the audio or video signal’s maximum peak-to-peak signal voltage and the measured voltage of noise present when the signal is removed. Higher SNR figures indicate that any noise introduced by system components will not be perceived in the picture and sound output signals.

Signal to Noise Ratio-8VSB (SNR) As applies to 8VSB transmissions, this is a calculated average power of the ideal signal divided by the actual demodulated signal power.

SMPTE Society of Motion Picture and Television Engineers

Standard Definition Television (SDTV) This term is used to signify a digital television system in which the quality is approximately equivalent to that of NTSC. This equivalent quality may be achieved from pictures originated at the 4:2:2 level of ITU-R BT.601 and subjected to processing as part of the bit rate compression. The results should be such that when judged across a representative sample of program material, subjective equivalence with NTSC is achieved. The displayed picture may be either the traditional 4:3 or the wide-screen 16:9 aspect ratio.

STL Studio Transmitter Link

Synchronous Detection A common detection technique used in television demodulators that removes quadrature distortion, enabling comparison of transmitter output with video input signal.

S-Video Also Y/C. Transmits luminance and color portions separately via multiple wires, thus avoiding the color encoding process and resulting loss of picture quality.

Tally A system used to light lamps and indicate usage. Most production switchers have an internal tally system to indicate selected functions, and which selected functions are currently involved with Program.

TCP Transmission Control Protocol

Telecine A device used to convert film to video; movie film is digitally sampled and converted to video frame by frame in real-time.

TCXO Temperature Compensated Crystal Oscillator

THD Total Harmonic Distortion

Transport Stream-ATSC (TS) Consists of the following: (1) Packets: 188 bytes - fixed length with descriptive data, (2) Carries several programs, (3) has a PID which identifies the type of TS packet (video, audio, other), and (4) carries descriptive information about the program.

UHF Ultra High Frequency

Unity Gain An electronic term indicating that a signal will be neither amplified or attenuated. One volt of signal level in results in one volt of signal level out.

Vector A measure that has two individual properties: magnitude and direction.

Vector Clip A special encoded clip version that limits only the C_B and C_R input video signals and does not affect (nor is it affected by) the luminance component. This color-only clip limits the maximum vector excursions as viewed in an encoded state and is intended for users who wish to prevent encoded vectors from ever exceeding the perimeter circle of an encoded vector display.

VHF Very High Frequency

VITC Vertical Interval Time Code, a method for recording on to video tape the timecode address for each video frame inserted in the vertical interval.

Waveform A visual representation of a signal in the shape of a wave that plots amplitude versus time.

White Level The brightest part of a video signal, corresponding to approximately 1.0 Volt.

White Balance An electronic process used to calibrate the picture for accurate color display in different lighting conditions.

Wipe A special effect in which two pictures from different video sources are displayed on one screen. Production switchers and special effects generators provide numerous wipe patterns varying from simple horizontal and vertical wipes to multi-shaped, multi-colored arrangements.

XGA High resolution 1024x768 non-interlaced (progressive) display monitor

XVGA Extended Video Graphics Adapter

YP_BP_R: CAV format composed of luminance (Y) and two color difference signals (P_B and P_R)

Y/C Also S-video. Describes the separation of video signal luminance and chrominance components.

Zero Carrier Pulse (chopper) In a TV demodulator, removes the carrier in the vertical interval for a short period, enabling depth of field measurement.

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