



TECHNICAL MANUAL

INTEGRITY 600 SERIES

AES600 FAMILY OF DIGITAL AUDIO DISTRIBUTION AMPLIFIERS

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June, 2008



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Chapter 1 About This Manual

1.1 DOCUMENTATION AND SAFETY OVERVIEW

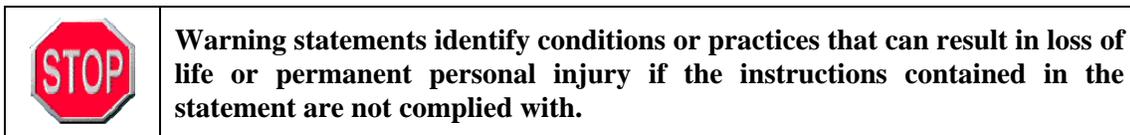
This manual provides instructions for the installation, operation, and maintenance as well as a top-level functional description of the AES600 Family of Digital Distribution Amplifiers built by QuStream.

It is the responsibility of all personnel involved in the installation, operation, and maintenance of the equipment to know all the applicable safety regulations for the areas they will be working in. *Under no circumstances should any person perform any procedure or sequence in this manual if the procedural sequence will directly conflict with local Safe Practices. Local Safe Practices shall remain as the sole determining factor for performing any procedure or sequence outlined in this document.*

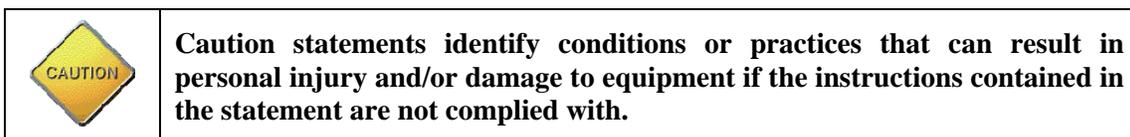
1.2 WARNINGS, CAUTIONS, AND NOTES

Throughout this document, you should notice various Warnings, Cautions, and Notes. These addendum statements supply necessary information pertaining to the text or topic they address. It is imperative that audiences read and understand the statements to avoid possible loss of life, personal injury, and/or destruction/damage to the equipment. These additional statements may also provide added information that could enhance the operating characteristics of the equipment (i.e., Notes). Examples of the graphic symbol used to identify each type of statement and the nature of the statement content are shown in the following paragraphs:

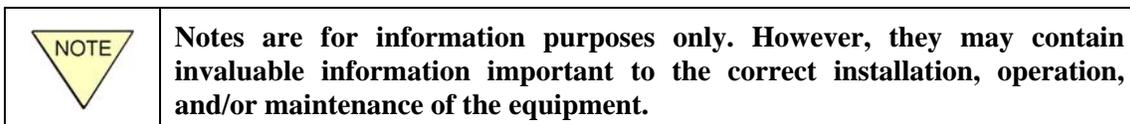
1.2.1 WARNING



1.2.2 CAUTION



1.2.3 NOTE



Chapter 2 Introduction

2.1 DESCRIPTION

QuStream’s AES600 family of Digital Audio Distribution Amplifiers is a member of the Integrity 600 Series of video and audio processing products, featuring “Fortel Inside” Technology. There are two versions of the AES600, both are functionally similar and accept AES audio input and provide multiple outputs of the input audio signal. Both modules mount in the FRM603 chassis frame. Redundant power and control are optionally available to every processing module through the chassis frame. Modules differ in the number of audio input and output signals - each is identified below:

- AES617 - 1 AES audio input and 7 audio output signals using a single-width rear panel
- AES626 - 2 AES audio inputs and 6 audio output signals using a single-width rear panel

The AES626 dual input module is actually composed of two independent DAs – configured as dual 1X3 distribution amplifiers.

Figure 2-1 shows, for reference only, a typical 600 Series module with a single-width rear panel attached to the main circuit board.

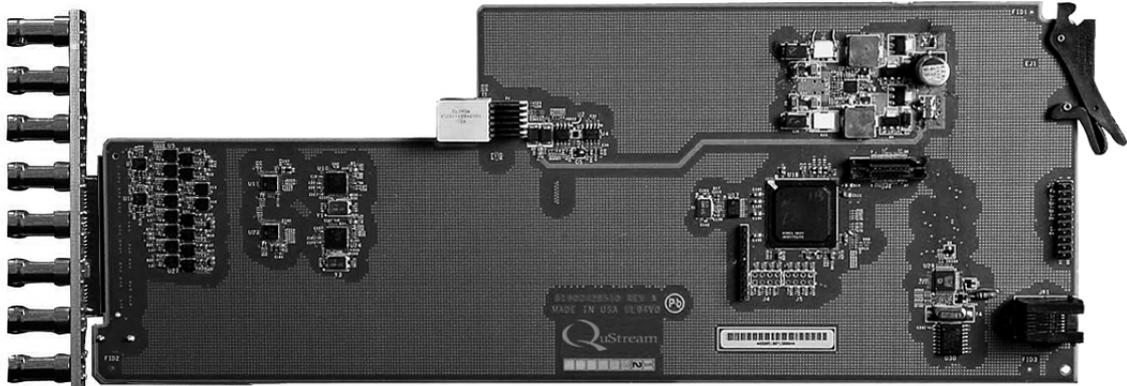


Figure 2-1 Typical 600 Series Module

Primary Features

- Distribution amplifier with audio processing.
- Accepts input signal from rear-panel BNC, adjacent module or Star Slot
- Redundant power, reference and control are optionally available to every board for increased reliability
- Full audio processing with independent or group gain, channel swapping, phase inversion and summing.
- Configurable summing for monaural mixes.
- Any input can drive any output or set of outputs, while any other input can drive any or all other outputs.
- Interface to adjacent synchronizers, UDCs, embedders, de-embedders and Star Slot boards via the chassis midplane.
- Mid-plane signal routing allows I/O expansion of signal processing modules
- Field-configurable when installed in a FRM603 frame equipped with the NET603 Frame Controller

Specifications

AES Inputs

Standard:	SMPTE 276M
Number of Inputs:	2 (4 channels)
Connector type:	BNCs
Input Level:	1 Volt p-p
Coupling:	Active Differential Input
Input Impedance:	75 Ohm
Return Loss:	>25 dB, 100kHz to 6MHz
Equalization:	Automatic
Sampling Frequency:	32kHz, 44.1 kHz, 48kHz and 96kHz

AES Outputs

Number of Outputs:	6 (12 channels)
Connector Type:	BNCs
Output Level:	1 Volt p-p
Output Impedance:	75 Ohm
Return Loss:	>25 dB, 100kHz to 6MHz

Electrical & Misc.

Input Voltage:	+24 V from the midplane
Power:	6 watts
Environmental:	0 C to 45 C

Chapter 3 Installation

3.1 INTERNAL ROUTING CONSIDERATIONS

The AES617 and AES626 AES DA modules are not equipped for mid-plane routing functions. When determining in which frame slot to install the module, you should consider whether or not internal signal routing capabilities of the frame are to be used for signal input or output sharing by other modules installed in the frame. For further information on planning an Integrity 600 Series system using internal routing capability, refer to the Technical Manual for the FRM603 frame, QuStream Publication 81-9059-0622-0.

There are no restrictions on placing modules in the FRM603 frame – any module will function stand-alone in any slot. However, if you are intending to incorporate internal frame routing, adjacent module signal sharing or Star Slot routing, you should have the system pre-planned prior to module installation. QuStream recommends that you make a detailed drawing of your system and follow it when loading modules into the frame. The following guidelines will help you in your system planning, but they are not intended to be an all-inclusive, step-by-step guide.

- Make a listing of the modules you will use in your system, and determine the internal routing capability of each module. Not all 600 Series modules share the same capabilities: for example some of the 600 Series dual input distribution amplifiers are actually two independent amplifiers; one of which can receive input signals from the module *LEFT* adjacent to it, or the Star Slot *A* routing bus, and the other can receive input signals from the module *RIGHT* adjacent to it, or the Star Slot *B* routing bus.
- Not all modules are equipped for internal signal routing. If you are going to use internal routing in your layout, it would not be advisable to install modules without such capability in a Star Slot or in a frame slot you may need for signal sharing.
- Consider placement of modules you intend to share signals first. Include in your sketch which module will receive a signal from an external source, how you want signals distributed to other modules and with which module the internal routing will terminate.

3.2 INSTALLATION PROCEDURE

Every Integrity 600 Series processing module consists of a rear connector panel and the main circuit card. These two items are shipped as a set, but must be installed individually into the FRM603 chassis frame. AES600 rear connector panels occupy one card slot in the FRM603, and may be installed in any available slot in the chassis frame. Proper installation requires that the rear connector panel be installed before the circuit board. Observe the following precautions before proceeding with installation:

CAUTION

Damage may occur to the rear connector panel or the circuit board if the installation instructions are not properly followed.

- Rear connector panel **MUST** be installed before the front-mounted circuit board.
- If a circuit board should occupy a chassis frame slot where a rear connector panel is to be added or changed, the circuit card **MUST** be removed or slid out a minimum of two inches from the front side of the chassis frame before installing the rear connector panel.

It is not necessary to remove power to the chassis frame prior to installing a processing module.

3.2.1 INSTALL REAR CONNECTOR PANEL

Install rear connector panel as follows:

1. If your processing module was shipped with the rear connector panel attached to the main circuit board, separate the two units.
2. Figure 3-1 illustrates the connector panel installation process using a single-width panel; however the procedure is identical for installing a double-width rear panel.
3. Orient the rear connector panel with the main board connector toward the lower edge of the chassis.
4. Install the panel by pressing it upward under the top lip of the chassis frame, and move the panel toward the chassis until it is flat against the chassis frame, refer to Figure 3-1.
5. Allow the bottom edge of the connector panel to drop down into its mating slot at the bottom of the lower edge of the chassis.
6. Install retention screw through connector panel to chassis frame, but **DO NOT** fully tighten the retention screw, leaving the rear panel freedom to move, until after the Main Circuit Board is installed per Paragraph 3.2.2.

CAUTION

DO NOT fully tighten the retention screw until **after** the Main Circuit Board is installed. Severe damage could occur to the main board connector if the rear panel is tightly secured prior to installing the main board.

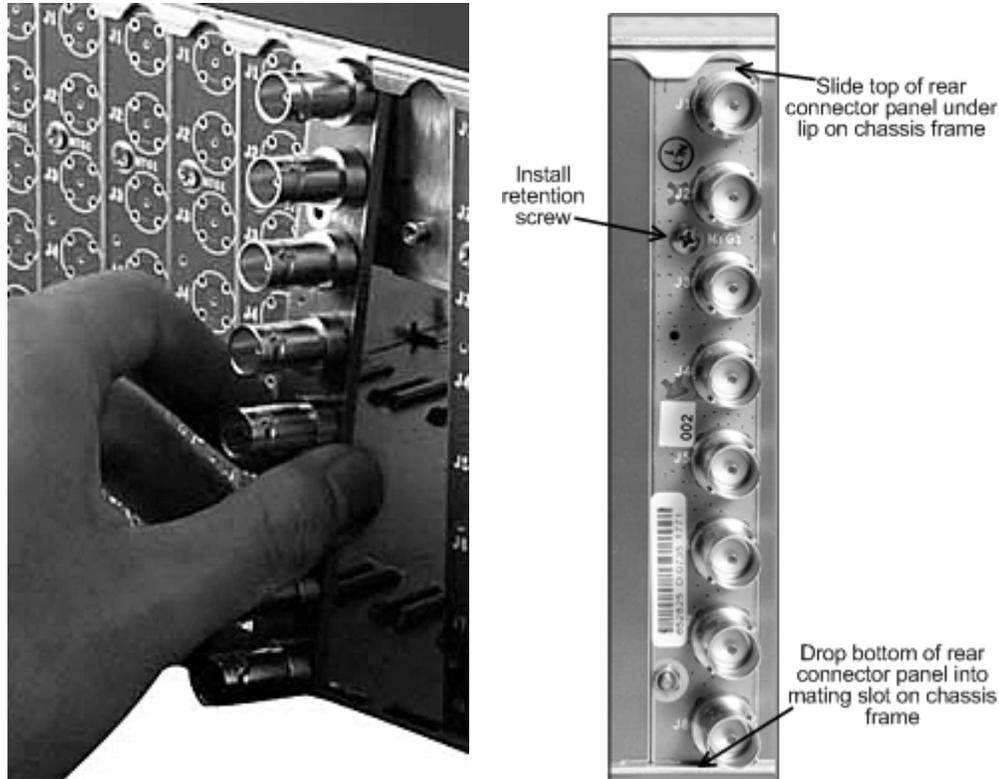


Figure 3-1 Installing Rear Connector Panel

3.2.2 INSTALL MAIN CIRCUIT BOARD

Install main circuit board as follows:

1. Open front access door on the FRM-603 chassis frame.
2. Locate the empty card slot that mates to the rear connector panel installed in the previous step.
3. Align the top and bottom edges of the circuit board with the chassis card guides as shown in Figure 3-2.
4. Hold the card ejector lever out (unlocked position) as shown when inserting the board.
5. Press the board into place to ensure solid connection with the mating connectors on the mid-plane and rear connector panel.

NOTE

Do not force the card into position. If the card does not seat with gentle pressure, back it out, realign with the card guides and reinsert the card.

6. When the card is properly seated, press the card ejector lever toward the board to lock the card in position.
7. Once the main board is seated and locked, and all connectors have properly mated, secure the rear connector panel to the chassis frame by tightening the retention screw.
8. Close the chassis frame front access door.

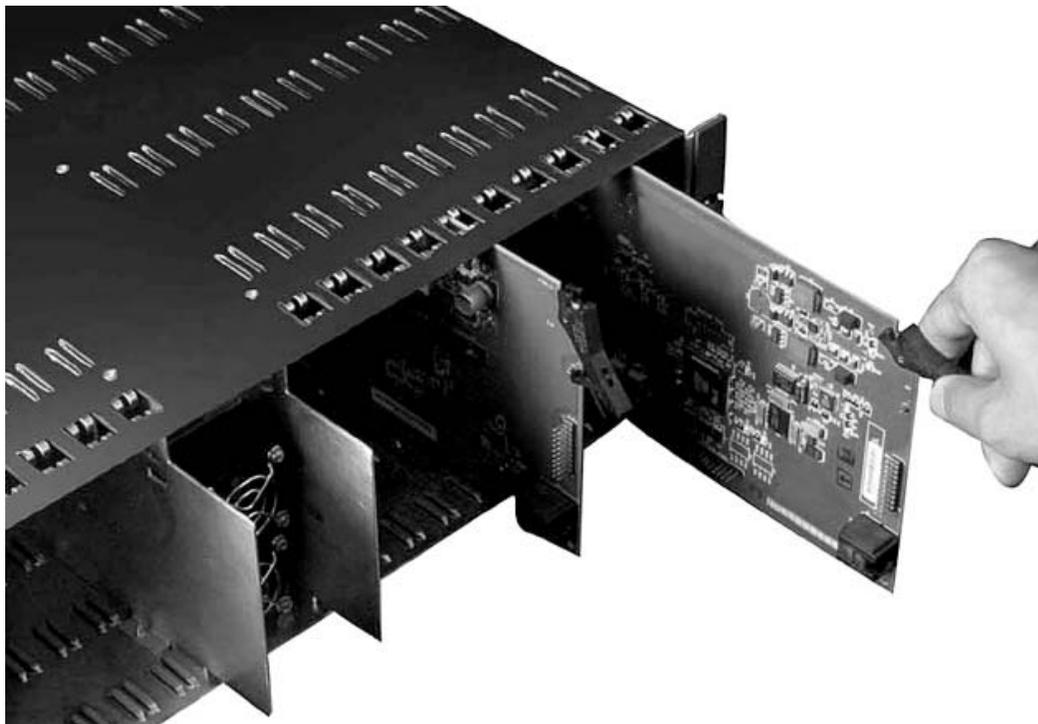


Figure 3-2 Installing Main Circuit Board

3.3 REAR PANEL SIGNAL CONNECTIONS

Input and output connections for both the AES617 and AES626 modules are made through BNC connectors on a single-width rear connector panel. Rear connector panel layouts are shown in Figure 3-3. When making connections to the rear panel connectors, use a good quality coaxial cable and ensure that the mating BNC connector is properly installed.

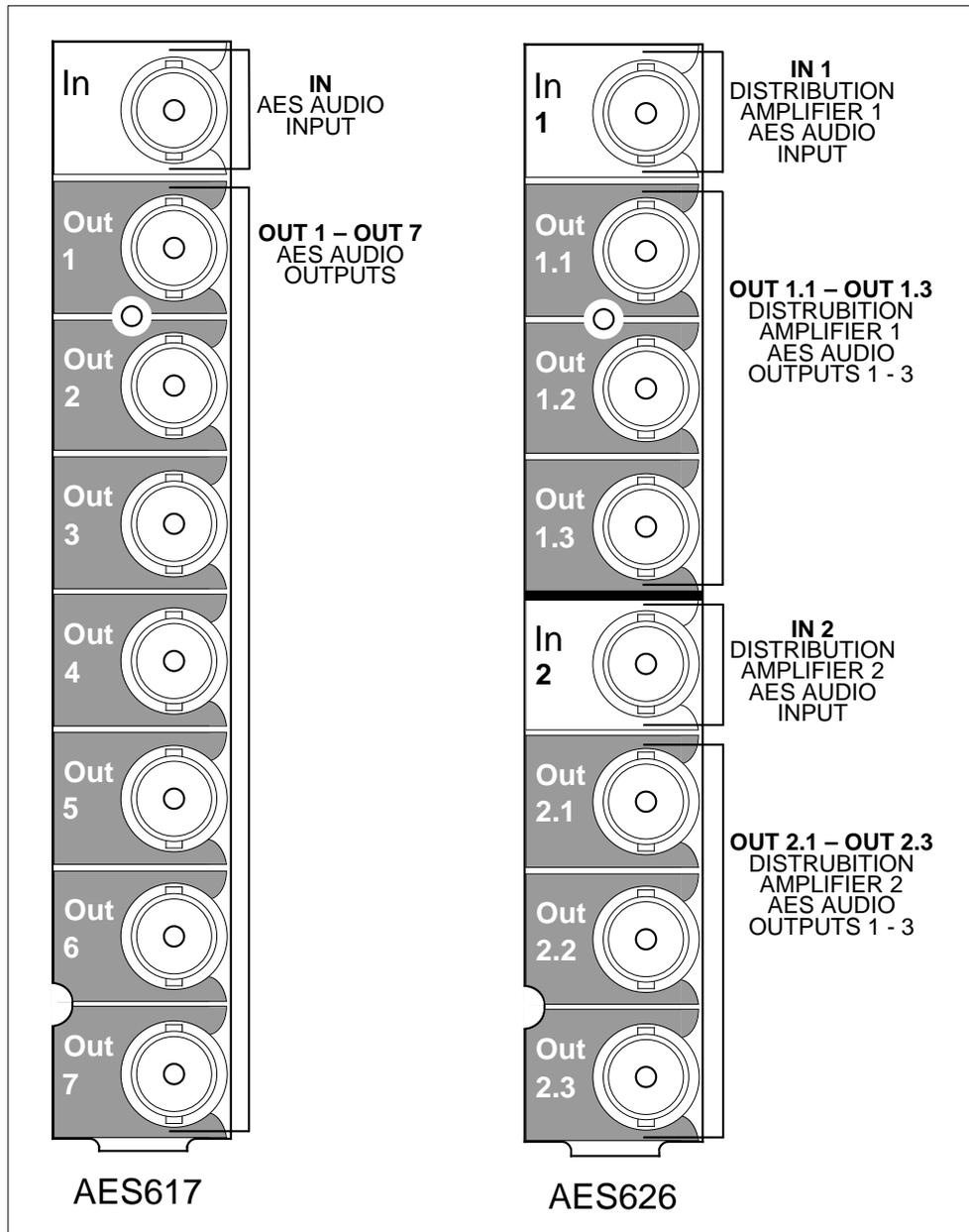


Figure 3-3 AES617 and AES626 Module - Rear Panel Connections

3.3.1 AES617 MODULE CONNECTIONS

The AES617 digital audio distribution amplifier provides one input for AES audio and seven outputs of the audio source. Rear panel connections for the module are provided in Table 3-1.

Table 3-1 AES617 Rear Panel Connections

Rear Panel BNC Connector	Signal
In	AES Audio Input
Out 1 thru Out 7	DA Audio Outputs 1 thru 7

3.3.2 AES626 MODULE CONNECTIONS

Each AES626 digital audio distribution amplifier is configured as a dual 1X3 DA, and provides two inputs for AES audio with three outputs for each audio source. Rear panel connections for the module are provided in Table 3-2.

Table 3-2 AES626 Rear Panel Connections

Rear Panel BNC Connector	Signal	Rear Panel BNC Connector	Signal
In 1	DA Channel 1 AES Audio Input	In 2	DA Channel 2 AES Audio Input
Out 1.1	DA 1, Output 1	Out 2.1	DA 2, Output 1
Out 1.2	DA 1, Output 2	Out 2.2	DA 2, Output 2
Out 1.3	DA 1, Output 3	Out 2.3	DA 2, Output 3

3.4 INITIAL POWER-UP

It is not necessary to remove power when installing the AES600 module into an active chassis frame. If this is an initial installation, before applying power for the first time, please take time to go back and verify the following:

- Check for electrically sound connections, proper connector placement and possible wiring errors.
- Ensure that the chassis frame has a connection to a source of in-house sync, if required for the application.
- Check that all 600 Series modules, rear panels, power supply and controller modules are securely installed.

There is no power switch on the frame, and it is powered-up simply by connecting the main power cord to a source of primary power. Systems with redundant power supply modules have two main power cords, each of which must be connected to a source of primary power.

When the AES600 module is initially powered up, look at the status LEDs located on the module circuit board and verify proper operation as discussed in Paragraph 3.5.

3.5 AES600 STATUS LEDs

There are 5 status LEDs located on the circuit board of each AES600 module, as shown in Figure 3-4.

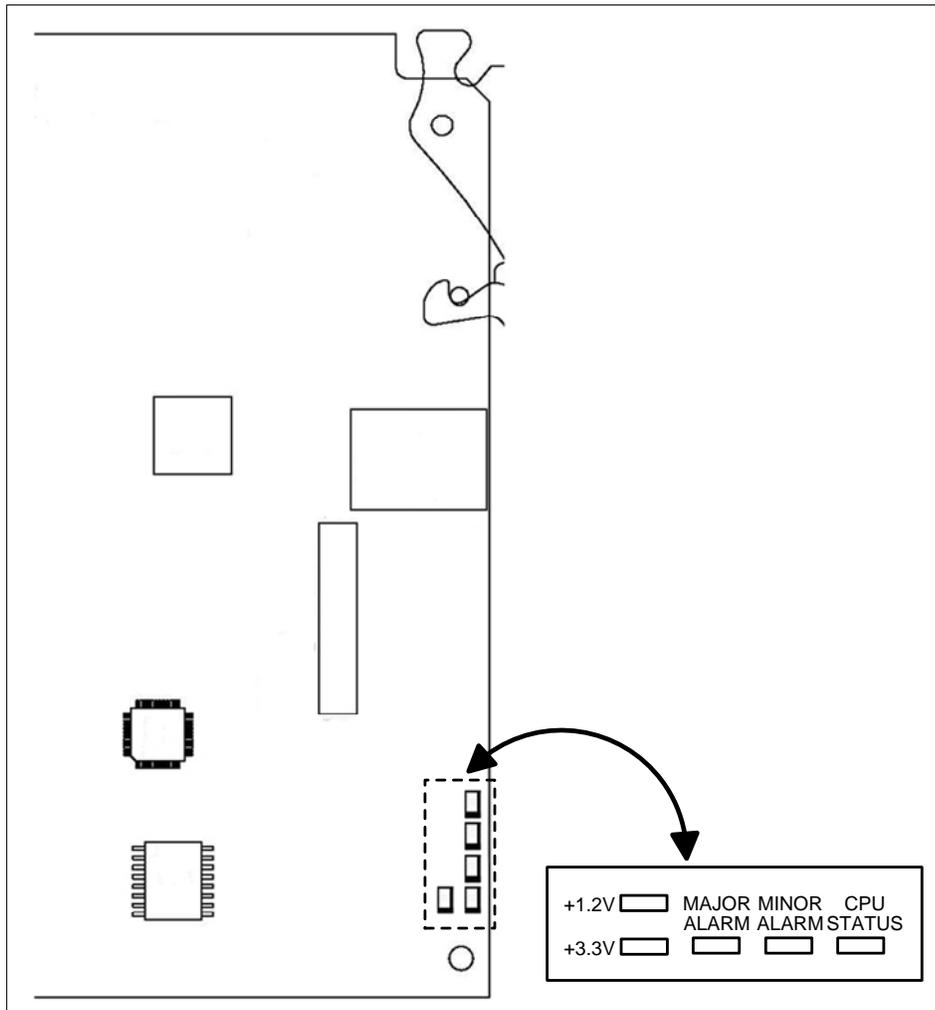


FIGURE 3-4 AES600 Status LEDs

Verify that the LED indicators are showing the proper operating status of the module. The function of each LED is discussed below.

- +1.2V – GREEN – When lit, indicates the 1.2V power supply is operational
- +3.3V – GREEN – When lit, indicates the 3.3V power supply is operational
- MAJOR ALARM – RED – When lit, indicates a major alarm condition detected
- MINOR ALARM – YELLOW – When lit, indicates a minor alarm condition detected
- CPU STATUS – GREEN – When flashing, indicates the CPU is active

Chapter 4 Operation

4.1 OPERATION

There are no operating controls located on the AES600 modules. Certain operating parameters of the DA module may be selected or modified through an external control device such as the Integrity 600 Series Remote Control Panel RCP-503, or the SOFT603 PC based software application, if the chassis frame is equipped with at least one NET 603 Frame Controller module. While most installations do contain the frame controller card, the module will function without a controller card present in the frame; however, options from the configuration menus discussed in this chapter can not be chosen or changed in the field. The module will be factory programmed prior to shipment. Refer to the RCP-503 Technical Manual, QuStream Publication 81-9059-0636-0 for control panel operation procedures. The following paragraphs introduce the configuration options and adjustments available through each configuration menu.

4.2 CONFIGURATION MENUS

When an AES600 module is installed in a FRM603 frame equipped with a NET603 Frame Controller card, certain configuration and operational parameters for the module may be selected through menus displayed via the RCP-503 Remote Control Panel, or the SOFT603 Control Panel application for Windows™.

Though functionally similar, the AES617 and AES626 differ in that the AES617 module is configured as a single input DA with seven output signals; while a single AES626 module is actually a dual 1X3 DA and contains two independent distribution amplifiers, each with a single signal input and three output signals.

Configuration menus for each module are virtually identical, the difference being the dual input DA menu screens provide adjustments for four audio channels, and the single input module screens provide adjustments for two audio channels.

The following paragraphs introduce the menus and options available through each. In instances where there is a difference between the menu screen for the AES617 and the AES626, an example screen for each will be shown.

4.3 MAIN MENU - SCREEN 1

Figure 4-1 shows screen 1 of the main menu display for the AES617 single input DA module, and Figure 4-2 shows the display for the AES626 dual input module. Both menus are functionally identical, but the dual input menu allows configuration of both independent amplifier circuits.



Figure 4-1 Single Input Module Main Menu Screen 1



Figure 4-2 Dual Input Module Main Menu Screen 1

LINKING

With both the AES617 and AES626, the gain of the input signal can be adjusted by selections on the main menu screen in one of two ways - the audio channels of the AES input signal may be adjusted independently (Linking Off) or the two signals may be linked together (Linking On). When the signals are linked, gain for both channels is adjusted as a group by a single control, and the balance between the two may be adjusted. Select the desired linking mode by pressing the touch-switch next to the **Linking: On/Off** menu item to toggle the linking function on or off.

The Linking menu entry indicates the current active status of the signal linking function. When the linking function is not active (off), the gain of each audio channel of the AES input signal may be adjusted as required by rotating the control knob beneath the channel number display, as shown in Figure 4-1.

Notice from Figure 4-2 the dual input module allows independent selection of the linking function for each AES signal input. On this illustration, both inputs are shown operating in the non-linked mode. Input 1 (Channels 1 and 2) linking is selected by the touch-switch on the left hand side of the menu screen and input 2 (channels 3 and 4) is selected by the touch-switch on the right side of the menu screen. When the channels are non-linked, gain of each audio channel may be independently adjusted as required by rotating the control knob beneath the channel number display.

When Linking is set to On as shown in Figure 4-3 for the AES617 and Figure 4-4 for the AES626, the audio channels are shown as being paired with a single gain control. Gain for the linked pair may be adjusted as required by rotating the control knob beneath the channel pair display. Balance between the two channels may be adjusted as required by rotating the Balance control beneath the channel pair display.



Figure 4-3 Single Input Module Main Menu Screen Showing Linked Audio Channels



Figure 4-4 Dual Input Module Main Menu Screen Showing Linked Audio Channels

RESET

Pressing the touch-switch next to the **Reset** menu entry opens the Reset Values Menu Screen, discussed in Paragraph 4.4.

MORE

Pressing the touch-switch next to the **More** menu entry brings up screen 2 of the main menu, discussed in Paragraph 4.5.

4.4 RESET VALUES MENU SCREEN

The Reset Values Menu Screen, Figure 4-5, displays the current settings for each audio pair along the bottom edge of the display screen. Resetting the values return each setting to the factory default. Press the touch-switch next to the **YES** menu entry to accept and execute the reset function. Select the **NO** menu entry to retain the current set values and return to the main menu display.



Figure 4-5 Reset Menu Screen

4.5 MAIN MENU – SCREEN 2

Screen 2 of the main menu contains the same entries for both the AES617 and AES626. Entry selections are shown by Figure 4-6 and discussed in the following paragraphs.

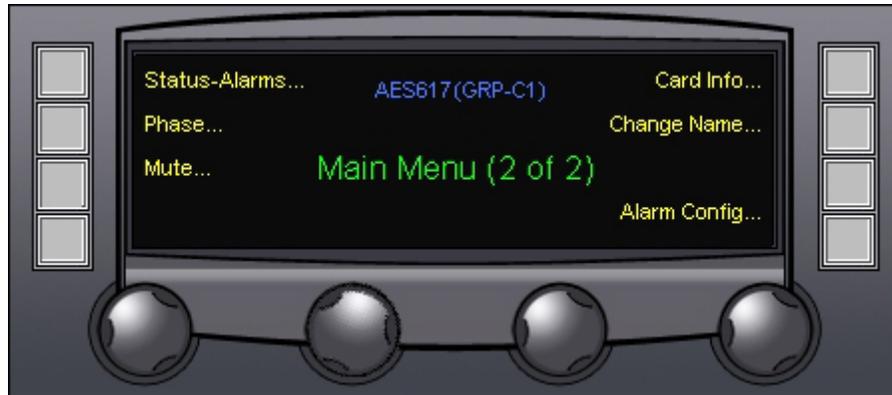


Figure 4-6 Main Menu Screen 2

STATUS-ALARMS

Pressing the touch-switch next to the **Status-Alarms** menu entry opens the Status and Alarms Display Screen, discussed in Paragraph 4.6.

PHASE

Pressing the touch-switch next to the **Phase** menu entry opens the Audio Phase Control Menu Screen, discussed in Paragraph 4.7.

MUTE

Pressing the touch-switch next to the **Mute** menu entry accesses the Audio Mute Control Menu Screen, discussed in Paragraph 4.8.

CARD INFO

Pressing the touch-switch next to the **Card Info** menu entry opens the Card Info Menu, discussed in Paragraph 4.9.

CHANGE NAME

Pressing the touch-switch next to the **Change Name** menu entry opens the Change Name Menu, discussed in Paragraph 4.10.

ALARM CONFIGURATION

Pressing the touch-switch next to the **Alarm Config** menu item allows access to the Alarm Configuration Menu Screen via the Access Code Screen, discussed in Paragraph 4.11.

4.6 STATUS AND ALARMS DISPLAY SCREEN

The Status and Alarms Display Screen, Figure 4-7, displays the current status of the audio signal inputs and module operating temperature. This is a display screen only – no configuration functions are accessible from this screen.

Display entries along the left side indicate the status of audio channels. Current operating temperature of the module is indicated by the **Temp:** display. The **Threshold:** entry displays the temperature selected through the alarm configuration screen for activating an over-temperature status alarm.



Figure 4-7 Status and Alarms Display Screen

4.7 AUDIO OUTPUT PHASE MENU SCREEN

Figure 4-8, illustrates the Audio Output Phase Menu Screen. Each audio channel is displayed at the bottom of the screen, along with its current Normal/Inverted phase status. Rotating the control knob beneath each audio channel applies or removes phase inversion for the indicated channel.

Pressing the touch-switch next to the **Reset** menu entry returns the module to factory default settings.



Figure 4-8 Audio Output Phase Menu Screen

4.8 AUDIO OUTPUT MUTE MENU SCREEN

Figure 4-9, illustrates the Audio Output Mute Menu Screen. Each audio channel is displayed at the bottom of the screen, along with its current muting on or off status. Rotating the control knob beneath each audio channel selects whether or not audio from the indicated channel is muted in the output stream.

Pressing the touch-switch next to the **Reset** menu entry returns the module to factory default settings.



Figure 4-9 Audio Output Mute Menu Screen

4.9 CARD INFORMATION MENU SCREEN

Enter the Card Information menu screen by pressing the touch-switch next to the **Card Info** entry on the main screen. Figure 4-10 shows the Card Info menu display, using an AES617 module as the example.



Figure 4-10 Card Information Display Screen

The card information screen displays the following operational data for the AES600 Series module:

- **SLOT** – Identifies the card slot in the FRM603 frame where the DVA module is located
- **CARDTYPE** – Identifies the model number of the DVA module
- **Software Version (SW-VER)** – Displays the revision number of the currently loaded software
- **Software Date (SW-DATE)** – Displays the release date of the currently loaded software

4.10 CHANGE NAME MENU SCREEN

Functions available through the Change Name menu screen allow you to enter a descriptive identification name, or alias – up to 8 characters - for the AES600 module. Typical application of this feature would be to name the module in such a way to associate it with its input signal or function, such as CAM 1, KEY VIDEO, etc. Figure 4-11 shows the Change Name menu display for all variations of the DVA600 modules.

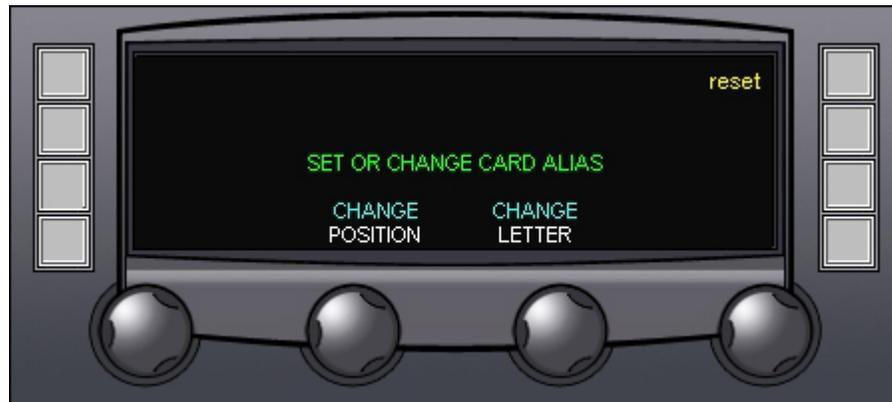


Figure 4-11 Change Name Menu Screen

CHANGE POSITION

Rotating the **CHANGE POSITION** control moves the cursor to the desired character position to enter or change.

CHANGE LETTER

Rotating the **CHANGE LETTER** control scrolls through all alphanumeric display characters - letters, numbers and punctuation marks are available. Once the desired character is displayed in the cursor position, simply move the cursor to the next position.

RESET

Pressing the touch-switch next to the **reset** menu entry sets the name display to the default card alias.

4.11 CONFIGURE ALARMS MENU SCREEN

Enter the Configure Alarms menu screen by pressing the touch-switch next to the **Alarm Config** entry on the main screen 2. Before you can gain access to the alarm configuration screen, you will be prompted for the proper access code as shown in Figure 4-12.

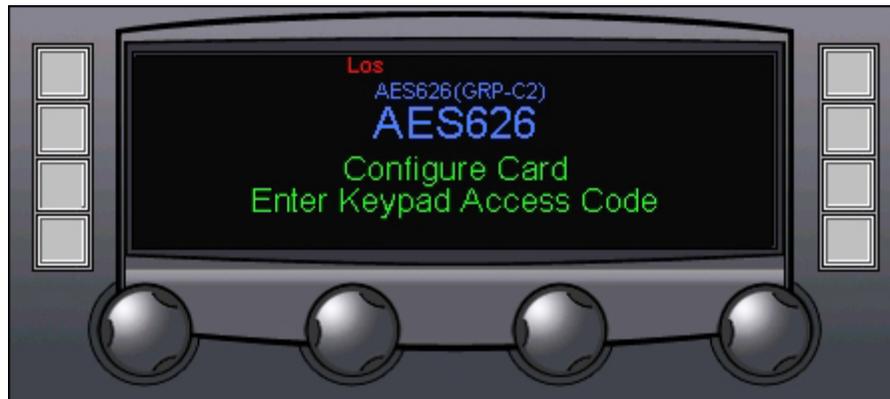


Figure 4-12 Keypad Access Code Prompt Screen

Enter the access code on the control panel keypad to access the Configure Alarms screen, Figure 4-13. This menu is the same for both the AES617 and AES626. Rotating the control knob beneath the **Select Alarm** menu entry on the bottom left of the display selects the board function to associate with an alarm as either over temperature (**OvrTemp**) or **Loss of Signal**. From the display for each alarm option, parameters for alarm activation may be selected. Each alarm option is presented in the following paragraphs.

4.11.1 OVER TEMPERATURE ALARM CONFIGURATION

The menu screen for configuring the Over Temperature Alarm is shown in Figure 4-13. This alarm triggers an alarm alert condition if the operating temperature of the AES module reaches or exceeds the selected threshold temperature. The following parameters may be selected for the over temp alarm:



Figure 4-13 Alarm Configuration Menu Screen

ALARM TYPE

Rotating the control knob beneath the **Alarm Type** menu entry selects the desired operating option for the over temp alarm from the following choices:

- **No Alarm** – Defeats the alarm function for an over temp condition.
- **Minor Alarm** - Triggers a minor alarm indication when the over temp threshold is reached.
- **Major Alarm** - Triggers a major alarm indication when the over temp threshold is reached.

TEMP

The **Temp** display indicates the current operating temperature of the AES module. This is a display only function.

THRESHOLD

Rotating the control knob beneath the **Threshold** menu entry determines the temperature (in degrees Celsius) at which the Over Temp alarm triggers.

4.11.2 LOSS OF SIGNAL ALARM CONFIGURATION

The menu screen for configuring the Loss of Signal Alarm is shown in Figure 4-14. This alarm triggers an alarm alert condition if the AES input signal is ever lost. The following parameters may be selected for the loss of signal alarm:



Figure 4-14 Alarm Configuration Menu Screen

INPUT CHANNEL (AES626 Only)

Rotating the control knob beneath the **Input Channel** menu entry selects for which AES input signal the alarm function is configured. This menu item is not present on the AES617 alarm configuration menu.

ALARM TYPE

Rotating the control knob beneath the **Alarm Type** menu entry selects the desired operating option for the over temp alarm from the following choices:

- **No Alarm** – Defeats the alarm function for an over temp condition.
- **Minor Alarm** - Triggers a minor alarm indication when the over temp threshold is reached.
- **Major Alarm** - Triggers a major alarm indication when the over temp threshold is reached.

