# TECHNICAL MANUAL

## INTEGRITY 600 SERIES

## AAB6214 ANALOG AUDIO DISTRIBUTION AMPLIFIER

*Publication:* 81-9059-0631-0, Rev. A

July, 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 Integrity 600 Series AAB6214 Analog Distribution Amplifier 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

| | |
|---|---|
|  | **Warning statements identify conditions or practices that can result in loss of life or permanent personal injury if the instructions contained in the statement are not complied with.** |

### 1.2.2 Caution

| | |
|---|---|
|  | **Caution statements identify conditions or practices that can result in personal injury and/or damage to equipment if the instructions contained in the statement are not complied with.** |

### 1.2.3 Note

| | |
|---|---|
|  | **Notes are for information purposes only. However, they may contain invaluable information important to the correct installation, operation, and/or maintenance of the equipment.** |

# Chapter 2 Introduction

## 2.1 DESCRIPTION

QuStream's AAB6214 Analog Audio Distribution Amplifier is a member of the Integrity 600 Series of video and audio processing products, featuring "Fortel Inside" Technology. It mounts in the FRM603 Chassis Frame and accepts an input of analog audio and provides multiple outputs of the audio signal. Redundant power and control are optionally available to every processing module through the chassis frame.

The AAB6214 dual input module is actually composed of two independent DAs – configured as dual 1X7 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.

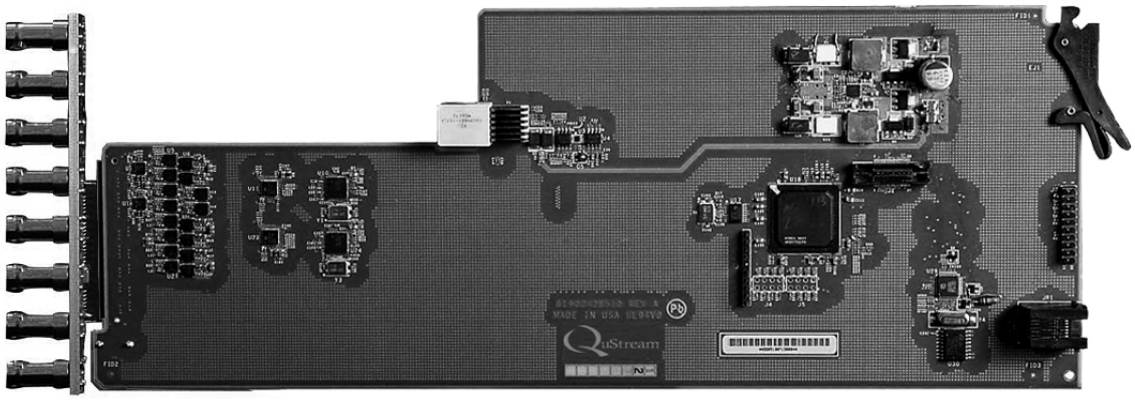


**Figure 2-1 Typical 600 Series Module**

### Primary Features

- Distribution amplifier with audio processing.
- 2 analog audio inputs with seven audio outputs for each input (Dual 1X7).
- Full audio processing with independent or group gain, channel swapping, phase inversion and summing.
- Rear-panel 6-pin detachable connectors for input and output signals.
- Redundant power, reference and control are optionally available to every board for increased reliability.
- Field-configurable when installed in a FRM603 Frame equipped with the NET603 Frame Controller.

**Specifications**

| | |
|---|---|
| Input Level | 28dBu MAX |
| Noise Factor | -87dBu (0dB input gain), -91dBu (+6dB input gain) |
| Common Mode Rejection | > 90dB @ 60Hz, 60dB @ 20kHz (tested +28dBu CM input) |
| Input Impedance | 33kΩ |
| Maximum Output Levels | +28dBu across hi-impedance load<br>+24dBm into 600Ω load (subject to a frame limit of 15 Watts maximum to any one card) |
| Input Gain | 0dB or +6dB |
| Output Gain | 0dB, +3.5dB or +9.5dB |
| Output Impedance | 66Ω |
| Frequency Response | ±0.05 dB 20Hz to 20kHz |
| Stereo Phase Match | < 1 degree at 20kHz |
| SNR | 100dB |
| Inter-Modulation Distortion | < .005% |
| Stereo Crosstalk | - 96 dB 20Hz to 20kHz |
| Input Voltage | + 24v from the mid-plane |
| Power | < 6 watts |
| Environmental | 0º C to 45º C |

# Chapter 3 Installation

## 3.1 INTERNAL ROUTING CONSIDERATIONS

The AAB6214 analog DA module is 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 Start 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. The AAB6214 rear connector panel occupies 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 fitted with BNC connectors; however the procedure is identical for installing a rear panel equipped with 6-pin detachable connectors.
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.

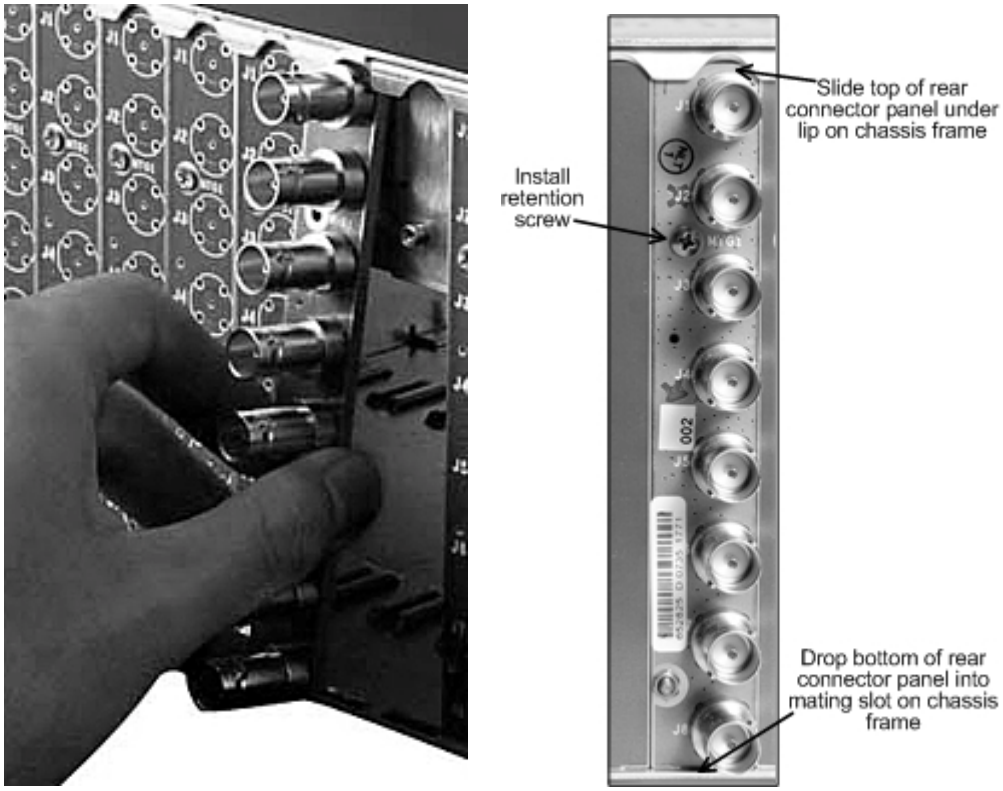



**Figure 3-1 Installing Rear Connector Panel**

### 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.

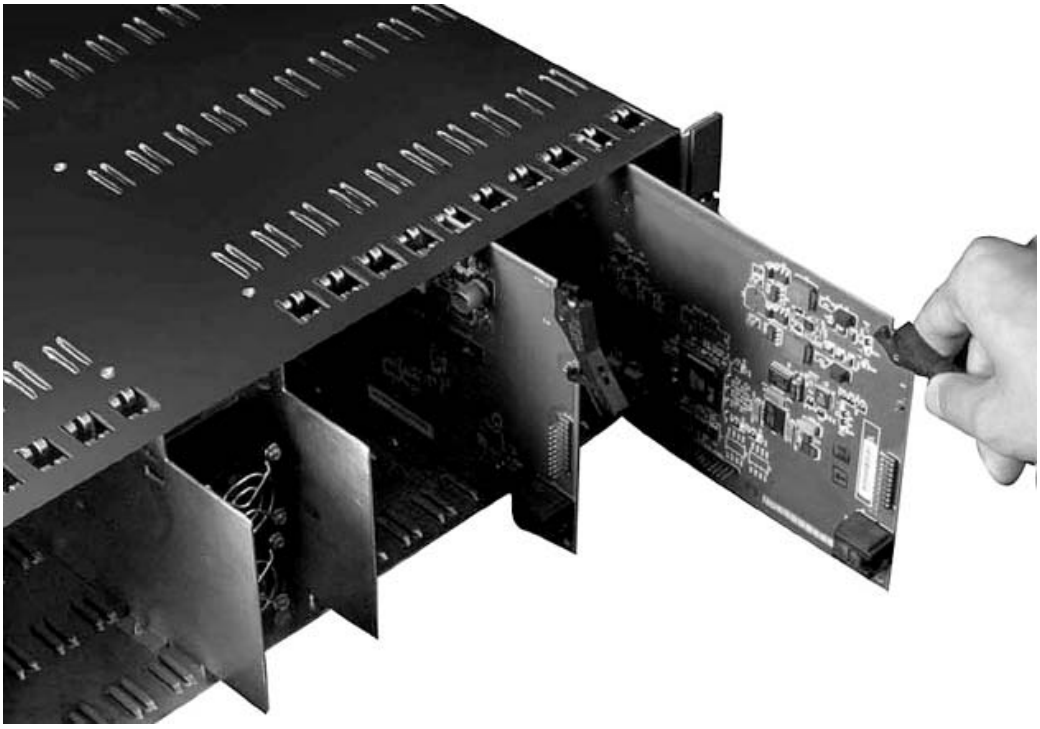


**Figure 3-2 Installing Main Circuit Board**

## 3.3 REAR PANEL SIGNAL CONNECTIONS

Input and output connections to the module are made through 6-pin detachable connectors on the single-width rear connector panel. Each connector provides 2 physical input or output connections for a total of 2 Input and 14 Output connections on each rear panel. Rear connector panel layout is shown in Figure 3-3. When making audio connections to the AAB6214 module, follow the pin-out data for rear panel audio connections presented by Figure 3-4 and Table 3-1. Use good quality cable and ensure that the mating plug is properly installed.

The mating plug used with the on-board connectors is a solderless type and uses a spring clamp to securely hold input or output cable wires. Connections are made by inserting the wire end into the round receptacle on the plug. The small square hole beside each wire receptacle contains a spring release that loosens the clamp and allows the wire to be removed from its associated receptacle. To remove a wire, simply insert the blade of a small flat tip screwdriver into the release hole adjacent to the receptacle containing the wire you wish to remove, and gently pull the wire from the receptacle.

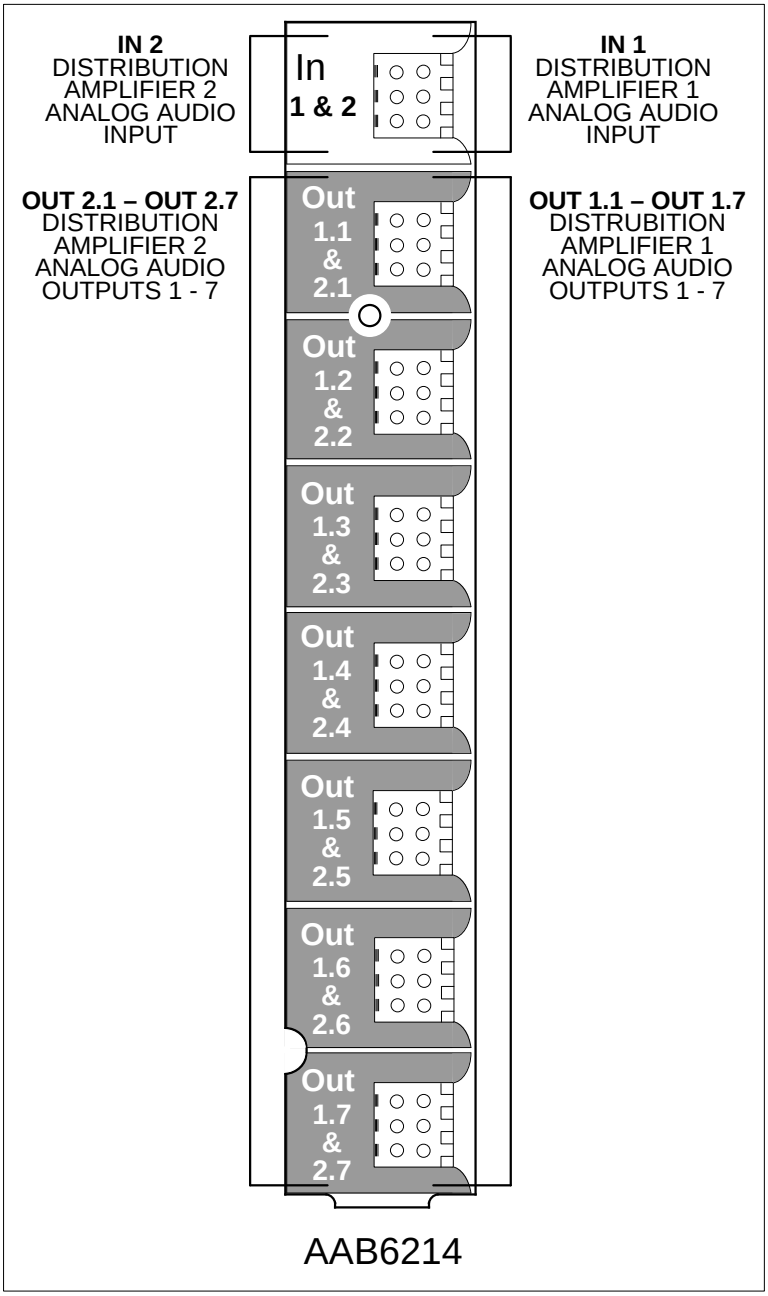



**Figure 3-3 AAB6214 Module - Rear Panel Connections**

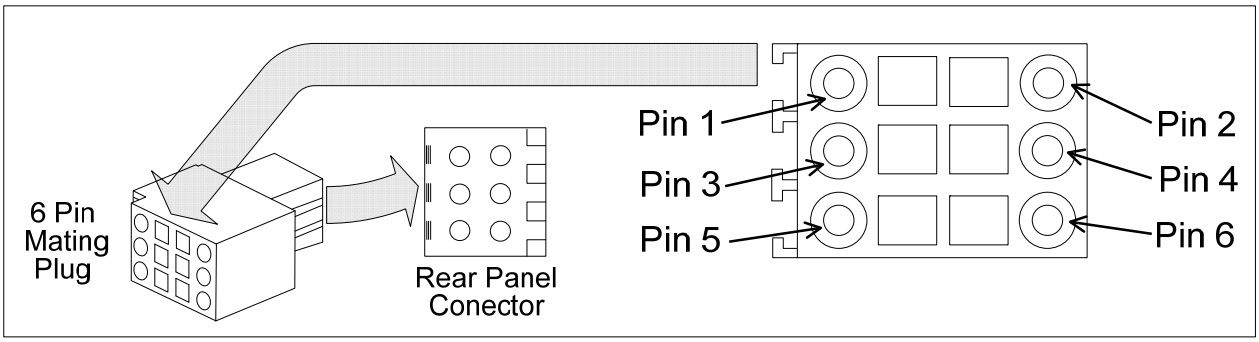



**Figure 3-4 6-Pin Detachable Connector Pin-Outs**

**Table 3-1 6-Pin Audio Connector – Pin-Out Chart**

| Backplane Connector | Signal | Pos. (+) Pin | Neg. (-) Pin | Ground (Shield) Pin | Backplane Connector | Signal | Pos. (+) Pin | Neg. (-) Pin | Ground (Shield) Pin |
|---|---|---|---|---|---|---|---|---|---|
| In 1 & 2 | DA Channel 1 Audio Input | 1 | 2 | 3 | Out 1.4 & 2.4 | DA 1, Output 4 | 1 | 2 | 3 |
| In 1 & 2 | DA Channel 2 Audio Input | 5 | 6 | 4 | Out 1.4 & 2.4 | DA 2, Output 4 | 5 | 6 | 4 |
| Out 1.1 & 2.1 | DA 1, Output 1 | 1 | 2 | 3 | Out 1.5 & 2.5 | DA 1, Output 5 | 1 | 2 | 3 |
| Out 1.1 & 2.1 | DA 2, Output 1 | 5 | 6 | 4 | Out 1.5 & 2.5 | DA 2, Output 5 | 5 | 6 | 4 |
| Out 1.2 & 2.2 | DA 1, Output 2 | 1 | 2 | 3 | Out 1.6 & 2.6 | DA 1, Output 6 | 1 | 2 | 3 |
| Out 1.2 & 2.2 | DA 2, Output 2 | 5 | 6 | 4 | Out 1.6 & 2.6 | DA 2, Output 6 | 5 | 6 | 4 |
| Out 1.3 & 2.3 | DA 1, Output 3 | 1 | 2 | 3 | Out 1.7 & 2.7 | DA 1, Output 7 | 1 | 2 | 3 |
| Out 1.3 & 2.3 | DA 2, Output 3 | 5 | 6 | 4 | Out 1.7 & 2.7 | DA 2, Output 7 | 5 | 6 | 4 |

## 3.4 INITIAL POWER-UP

It is not necessary to remove power when installing the AAB6214 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 AAB6214 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 AAB6214 STATUS LEDS

There are 5 status LEDs located on the circuit board of each AAB6214 module, as shown in Figure 3-5.

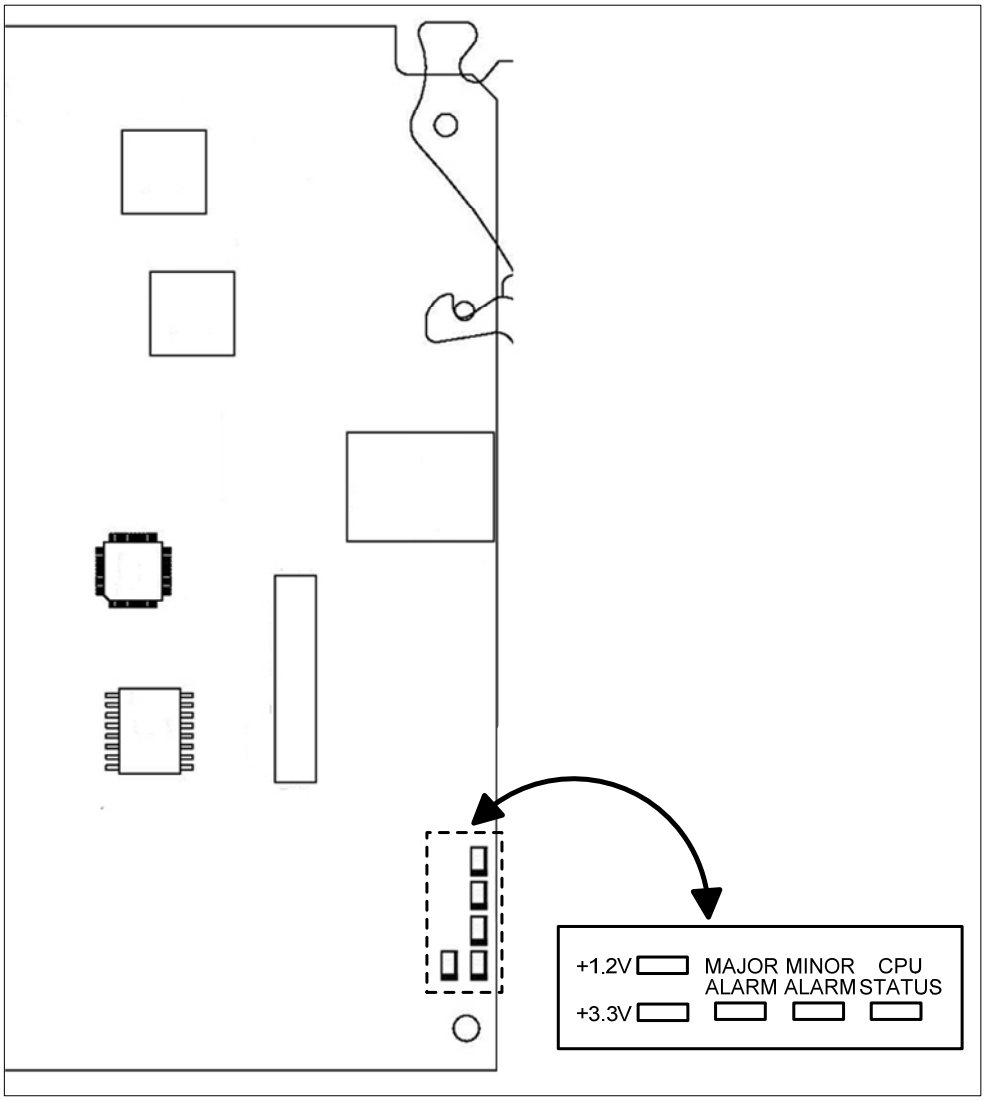



**FIGURE 3-5 AAB6214 Status LEDs**

Verify that the LED indicators are showing the proper operating status of the module. The function of each LED is discussed 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 AAB600 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 AAB6214 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-XXX-0 for control panel operation procedures. The following paragraphs introduce the configuration options and adjustments available through each configuration menu.

## 4.2 MAIN MENU - SCREEN 1

Figure 4-1 shows screen 1 of the main menu display for the AAB6214 DA module. Entries on the menu screen and functions available through each are discussed below.


**Figure 4-1 Main Menu Screen 1**

### LINKING

Gain of each analog input signal can be adjusted by selections on the main menu screen in one of two ways - the audio channels 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 input signal may be independently adjusted as required by rotating the control knob beneath the channel number display, as shown in Figure 4-1.

When Linking is set to On as shown in Figure 4-2, 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.

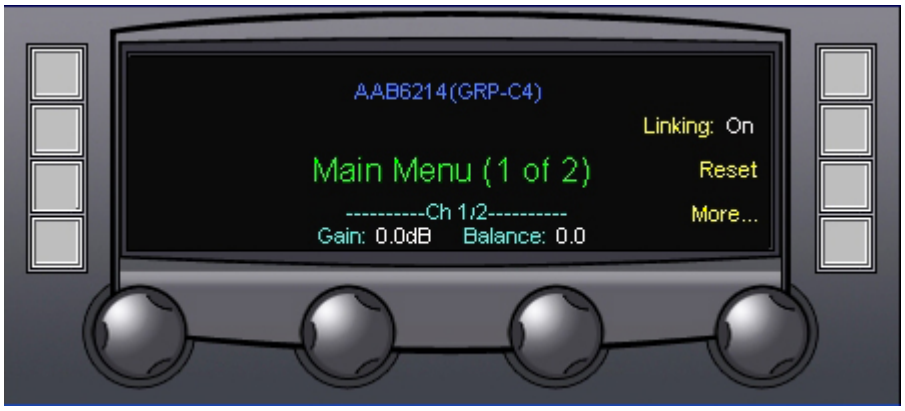



**Figure 4-2 Main Menu Screen Showing Linked Audio Channels**

**RESET**

Pressing the touch-switch next to the **Reset** menu entry accesses the Reset Values Menu Screen, discussed in Paragraph 4.3.

**MORE**

Pressing the touch-switch next to the **More** menu entry brings up screen 2 of the main menu, discussed in Paragraph 4.4.

## 4.3 RESET VALUES MENU SCREEN

The Reset Values Menu Screen, Figure 4-3, displays the current settings for each audio signal along the bottom edge of the display screen. Resetting the values returns 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 4-3 Reset Values Menu Screen**

## 4.4 MAIN MENU – SCREEN 2

Screen 2 of the main menu is shown by Figure 4-4 and discussed in the following paragraphs.

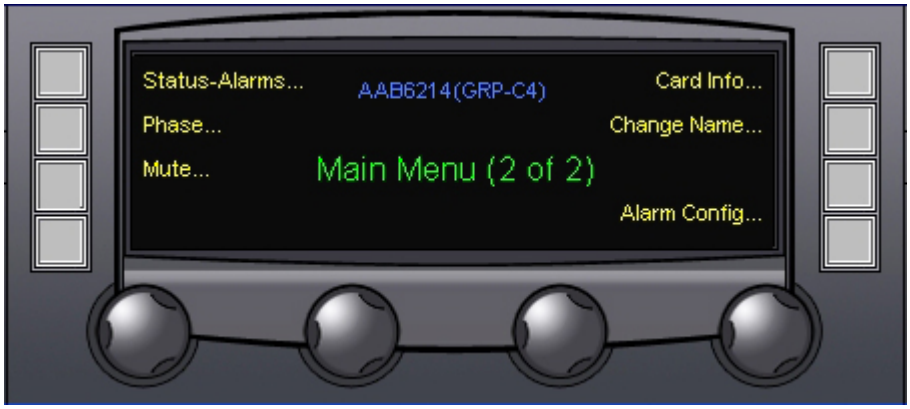



**Figure 4-4 Main Menu Screen 2**

### STATUS-ALARMS

Pressing the touch-switch next to the **Status-Alarms** selection accesses the Status and Alarm Display Screen, discussed in Paragraph 4.5.

### PHASE

Pressing the touch-switch next to the **Phase** selection accesses the Audio Phase Control Menu Screen, discussed in Paragraph 4.6.

### MUTE

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

### CARD INFO

Pressing the touch-switch next to the **Card Info** menu entry accesses the Card Info Menu, discussed in Paragraph 4.8.

### CHANGE NAME

Pressing the touch-switch next to the **Change Name** menu entry accesses the Change Name Menu, discussed in Paragraph 4.9.

### 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 4.10.

## 4.5 STATUS AND ALARMS DISPLAY SCREEN

The Status and Alarms Screen, Figure 4-5, 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 4-5 Status and Alarms Display Screen**

## 4.6 AUDIO OUTPUT PHASE MENU SCREEN

Figure 4-6 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 4-6 Audio Output Phase Menu Screen**

## 4.7 AUDIO OUTPUT MUTE MENU SCREEN

Figure 4-7 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 4-7 Audio Output Mute Menu Screen**

## 4.8 CARD INFORMATION MENU SCREEN

Enter the Card Information (Info) menu screen by pressing the touch-switch next to the **Card Info** entry on main screen 2. Figure 4-8 shows the Card Info display screen.


**Figure 4-8 Card Information Display Screen**

The card information screen displays the following operational data for the AAB6214 module:

- Current operating temperature of the module is displayed in the center area of the screen
- **SLOT** – Identifies the card slot in the FRM603 frame where the AAB6214 module is located
- **CARDTYPE** – Identifies the model number of the AAB6214 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
- **FPGA** – Displays the revision number of the programming code loaded into the FPGA device

## 4.9 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 AAB6214 module. Typical application of this feature would be to name the AAB module in such a way to associate it with its input signals or function. Figure 4-9 shows the Change Name menu display for the AAB6214 module.

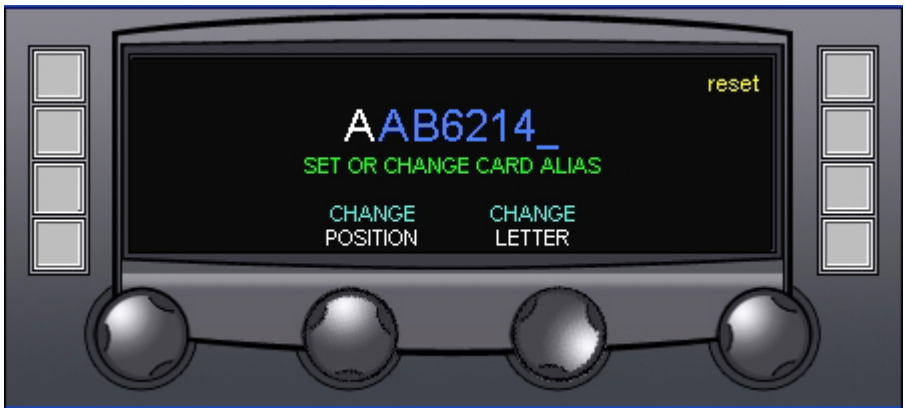



**Figure 4-9 Change Name Menu Screen**

**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.

## 4.10 CONFIGURE ALARMS MENU SCREEN

Enter the Configure Alarms menu screen by pressing the touch-switch next to the **Alarm Config** entry on 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 4-10.

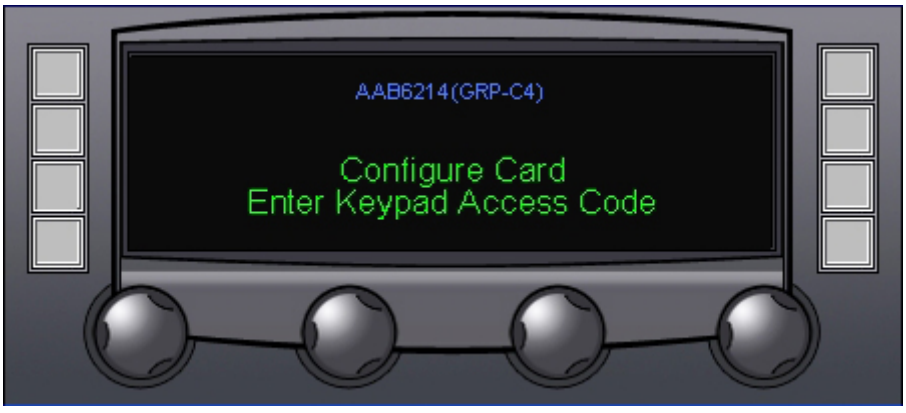



**Figure 4-10 Keypad Access Code Prompt Screen**

Enter the access code on the control panel keypad to access the Configure Alarms screen, as shown by Figure 4-11. Entries on the menu screen and functions available through each are discussed below.

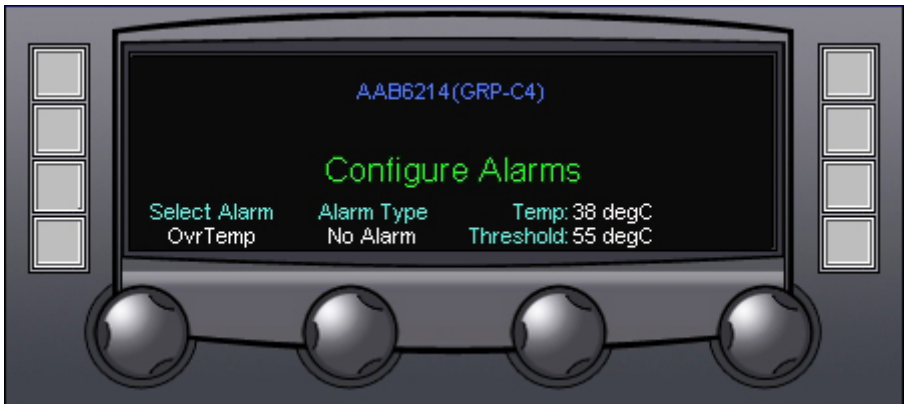



**Figure 4-11 Alarm Configuration Menu Screen**

### SELECT ALARM

Select Alarm allows selection of the board function and parameters to associate with an alarm condition. Alarm function may be selected by rotating the control knob beneath the **Select Alarm** display. The following alarm options are available:

- Over Temperature (**OvrTemp**) – Triggers an alarm alert condition if the operating temperature of the AAB module reaches or exceeds the selected threshold temperature
- Clipping 1 (**OvrFlow1**) – Triggers an alarm if the first input exceeds the set input level and causes clipping of the signal
- Clipping 2 (**OvrFlow2**) – Triggers an alarm if the second input exceeds the set input level and causes clipping of the signal
- I/O Board (**IOB**) – Triggers an alarm if the board is operated from a slot with the wrong I/O board installed
- Power Overload (**POL**) – Triggers an alarm if the total output load exceeds the capacity of the output power regulators, causing the outputs to trip off-line

### ALARM TYPE

The setting of the **Alarm Type** selector determines which, if any, alarm is associated with the board function selection. The following configuration options are available:

- **No Alarm** – The displayed alarm selection is not associated with any of the available alarms
- **Minor Alarm** - The displayed alarm selection will trigger a minor alarm indication when the alarm trip condition exists
- **Major Alarm** - The displayed alarm selection will trigger a major alarm indication when the alarm trip condition exists

**TEMPERATURE**

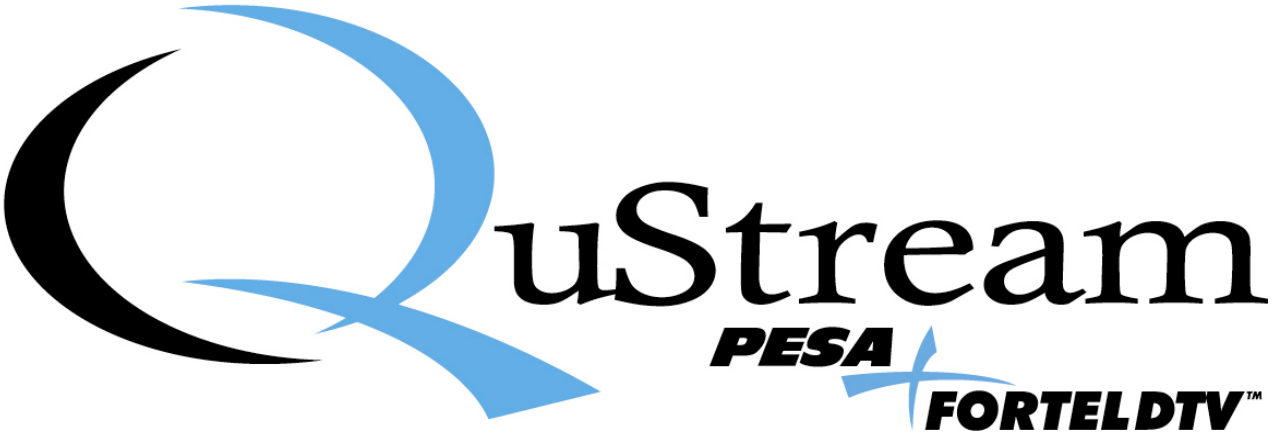
The temperature (**temp:**) display indicates the current operating temperature of the AAB6214 module. This is a display only function.

**THRESHOLD**

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

NOTE

Temperature and Threshold values are only displayed when the Select Alarm control is set to the Over Temperature (OvrTemp) selection.


QuStream
PESA
FORTELDTV™