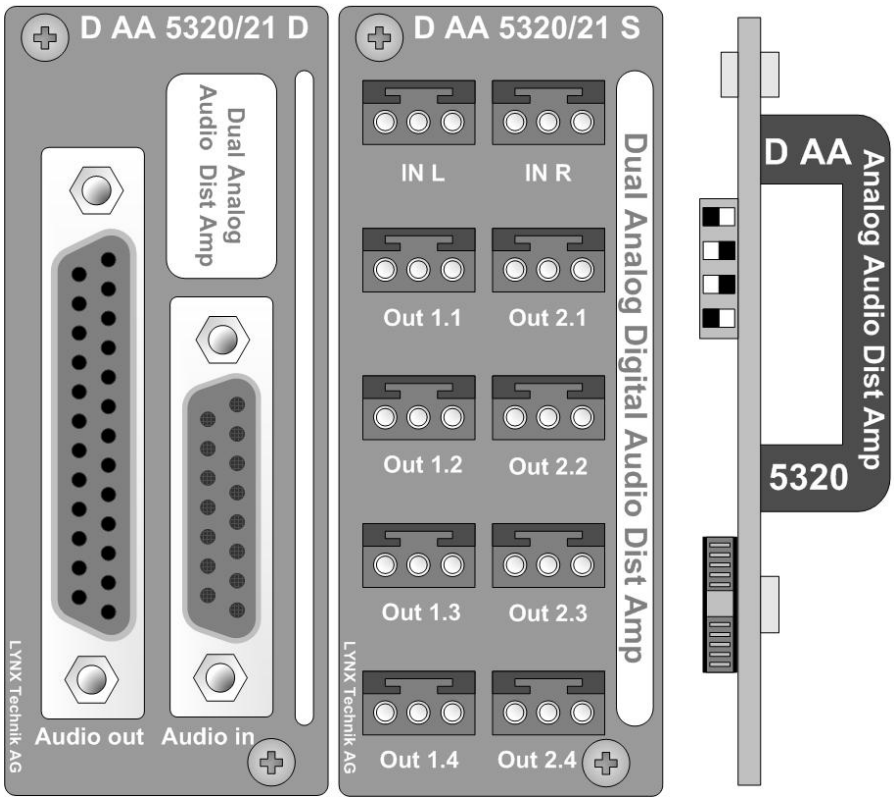
Version 2.1

Reference Manual

D AA 5320/21 D; D AA 5320/21 S

Analog Audio Distribution Amplifier

Series 5000 CardModule



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Warranty

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of two (2) year from the date of shipment. If this product proves defective during the warranty period, LYNX Technik AG at its option will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

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Regulatory information

Europe

Declaration of Conformity

We LYNX Technik AG
Brunnenweg 3
D-64331 Weiterstadt
Germany

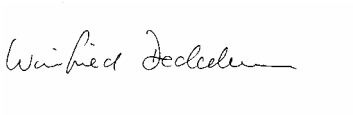
Declare under our sole responsibility that the product

TYPE: D AA 5320 D; D AA 5321 D;
D AA 5320 S; D AA 5321 S

To which this declaration relates is in conformity with the following standards (Environments E1-E3):

EN 55103-1 /1996
EN 55103-2 /1996
EN 60950 /2001

Following the provisions of 89/336/EEC and 73/23/EEC directives.



Weiterstadt, October 2006

Place and date of issue *Legal Signature*

USA

FCC 47 Part 15

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense

Contents

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Getting Started

Packaging

The shipping carton and packaging materials provide protection for the module during transit. Please retain the shipping cartons in case subsequent shipping of the product becomes necessary. Do not remove the module from its protective static bag unless observing adequate ESD precautions. Please see below.

ESD Warning

This product is static sensitive. Please use caution and use preventative measures to prevent static discharge or damage could result to module.

Preventing ESD Damage

Electrostatic discharge (ESD) damage occurs when electronic assemblies or the components are improperly handled and can result in complete or intermittent failure.

Do not handle the module unless using an ESD-preventative wrist strap and ensure that it makes good skin contact. Connect the strap to any solid grounding source such as any exposed metal on the rack chassis or any other unpainted metal surface.

Caution: Periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 Megohms.

Product Description

The D AA 5320/21 is a high quality analog audio distribution amplifier designed primarily for broadcast and professional applications.

Flexible configurations allow the D AA 5320/21 to be used for a 1 to 4 stereo application or a 1 to 8 mono application. The module has adjustable gain and signal presence detection is provided for each channel. The D AA 5321 has transformer isolated inputs and outputs.
Local presets / adjustments and alarms are provided on each module as well as optional remote control / status reporting and SNMP error reporting using the LYNX central control system.

The D AA 5320721 is part of the 5000 series of CardModules, which offer high quality, modularity and flexibility in a small form factor ideal for applications where space is at a premium.

CardModules are installed in the series 5000 card frame that can accommodate up to 10 CardModules. All modules are hot swappable and Options include full redundant power and a range of controller options.

Functional Diagram

Figure 1 below is the basic functional diagram for the D AA 5320/21 CardModule.

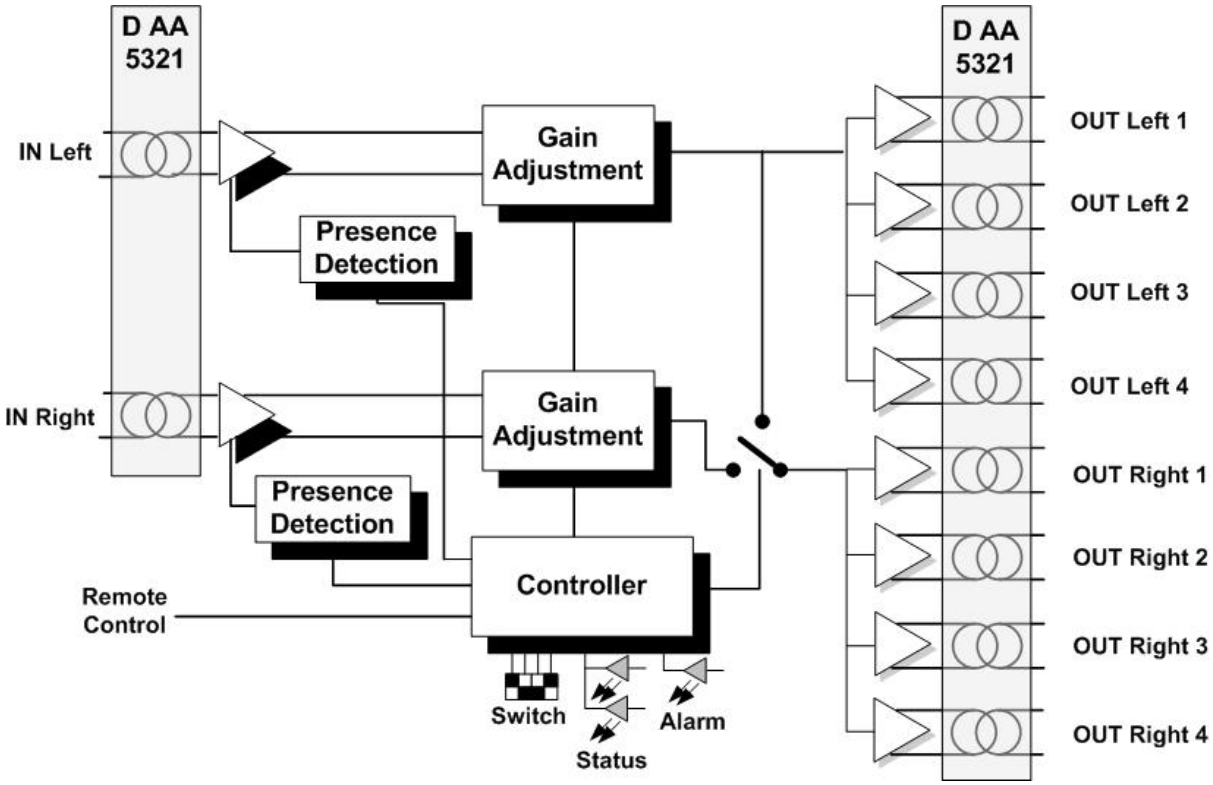
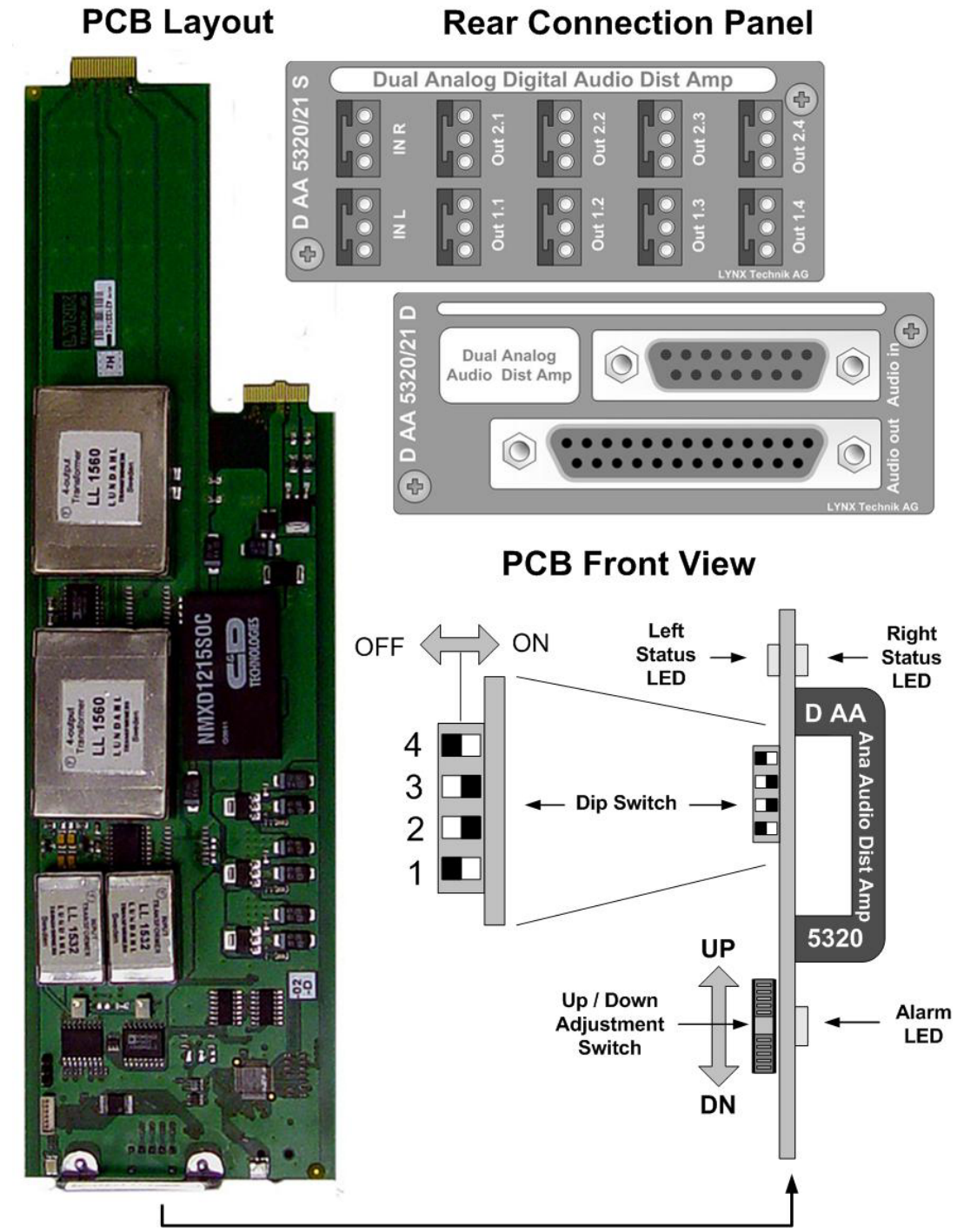


Figure 1- D AA 5320/21 Functional Diagram

Module Layout

Figure 2 shows the layout of the D AA 5320/21 CardModule and the rear connection panels. The rear connection panel utilizes Sub D connectors (D AA 5320/21 D) or Weco type connectors (D AA 5320/21 S) for the audio input and outputs. Please refer the connections section of this manual for wiring details for the connectors.



Transformers are only assembled on D AA 5321 modules

Figure 2 – Module Layout

Caution

Use static precautions when handling the PCB. Static discharge could result in serious damage to the module.

Audio Connections

D AA 5320/21 D

The D AA 5320/21 D MiniModule is configured for SubD audio connections. These connectors should be wired in accordance with the tables below. Please use high quality screened cable to prevent the introduction of noise and interference to the audio signals (twisted pair suitable for balanced audio signals).

Audio Output Connections (balanced)

SubD 25 pin female connector. (TASCAM pinout)

Pin Number	Connection	Pin Number	Connection
1	+ Left 1	14	- Left 1
2	GND Left 1	15	+ Right 1
3	- Right 1	16	GND Right 1
4	+ Left 2	17	- Left 2
5	GND Left 2	18	+ Right 2
6	- Right 2	19	GND Right 2
7	+ Left 3	20	- Left 3
8	GND Left 3	21	+ Right 3
9	- Right 3	22	GND Right 3
10	+ Left 4	23	- Left 4
11	GND Left 4	24	+ Right 4
12	- Right 4	25	GND Right 4
13	NC		

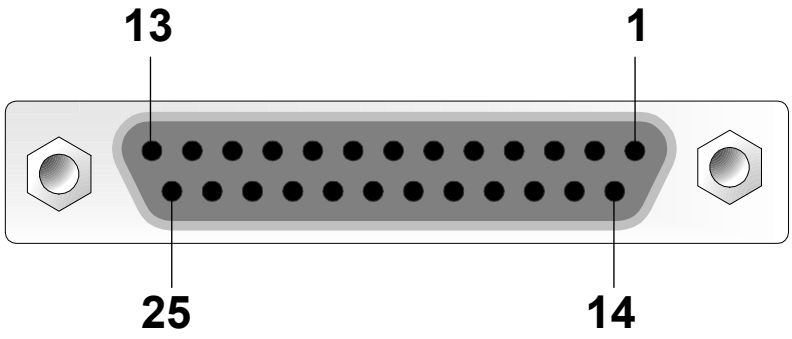


Figure 3 - Audio output connection detail

Audio Input Connector (balanced)

SubD 15-pin female connector

Pin Number	Connection	Pin Number	Connection
1		9	
2		10	
3		11	
4	+ LEFT IN	12	- LEFT IN
5	GND LEFT IN	13	+ RIGHT IN
6	- RIGHT IN	14	GND RIGHT IN
7		15	
8			

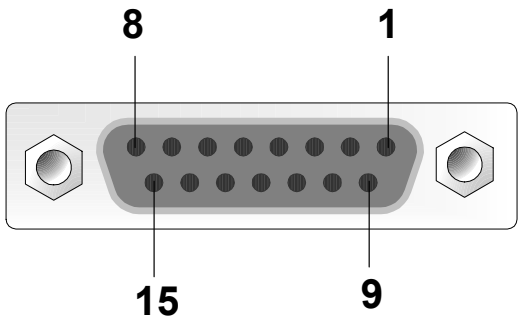


Figure 4 – Audio input connection detail

Audio Connections (un-balanced)

Although the module is designed primarily for balanced line audio connections it is possible to make un-balanced audio connections to the module.

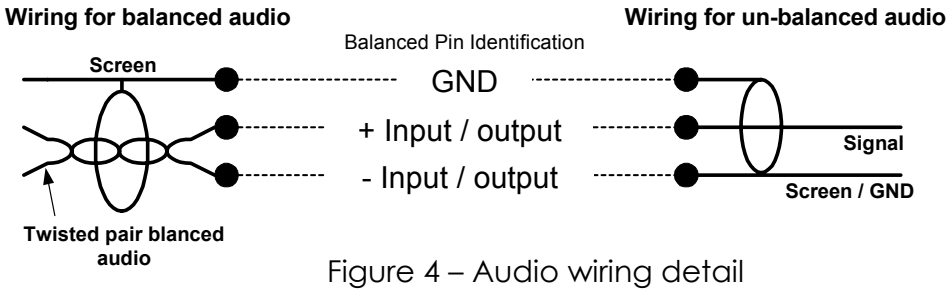


Figure 4 – Audio wiring detail

NOTE. When used in this manor certain technical specifications of the module cannot be maintained.

D AA 5320/21 S

The D AA 5320/21 S CardModule rear connection panel is configured for Weco type audio connections. These connectors should be wired in accordance with the table below. Please use high quality screened cable to prevent the introduction of noise and interference to the audio signals (twisted pair suitable for balanced audio signals).

Audio Connections (balanced)

Weco 3 pin connector

Pin Number	Connection
1	Positive (+)
2	GND
3	Negative (-)

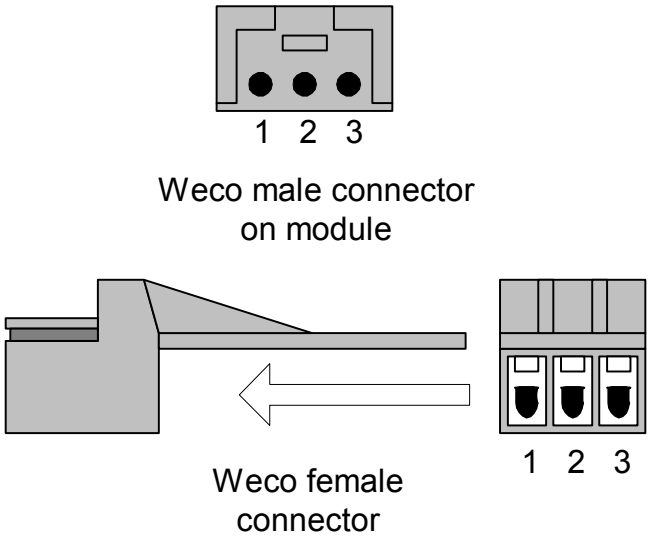


Figure 5- Weco connection detail

Audio Connections (un-balanced)

Although the module is designed primarily for balanced line audio connections it is possible to make un-balanced audio connections to the module.

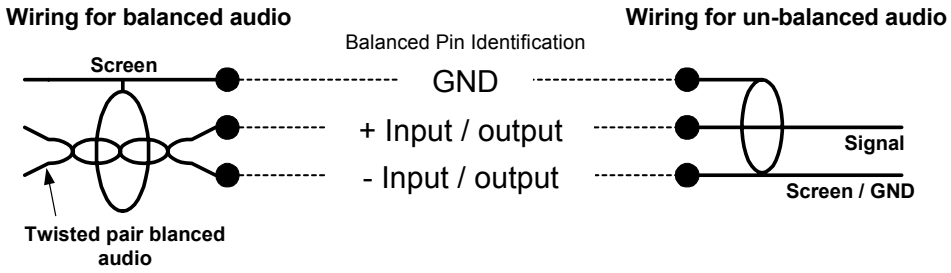


Figure 6 – Audio wiring detail

NOTE. When used in this manor certain technical specifications of the module cannot be maintained.

Installation

Caution
The CardModule is shipped in a protective anti-static bag. Please take suitable precautions to avoid static discharge onto any part of the PCB or components when handling module or serious damage could result.

Each Card Module is supplied with a rear connection panel and two mounting screws. Please follow the following procedure for installation of the card module into the Series 5000 Card Frame.

a) Select a slot in the card frame where the CardModule will be located
b) Remove the blank connection panel from the rear of the rack (if fitted)
c) Install the rear connection panel using the screws supplied. Do not tighten the screws fully
d) Slide the card module into the card frame and carefully check the CardModule easily connects to the rear connection plate. The card should fit easily and should not require excessive force to insert, if you feel any resistance, there could be something wrong with the rear connection panel location. Do not try and force the connection. Remove the rear connection panel and check alignment with the CardModule.
e) Insert and remove the CardModule a few times to ensure correct alignment and then tighten the two screws to secure the rear connection plate

Settings and Control

The D AA 5320/21 has an integrated micro-controller, which enables the module to be configured and controlled locally via the dip-switch and the up-down push button, or from remote when using one of the optional controllers and control software.

Once set, all settings are automatically saved in non-volatile internal memory. (Flash ram) The module will always recall the settings used prior to power down.

The module local configuration and gain settings are performed using a 4-position dip-switch and up/down adjustment switch on the front edge of the module. These controls are used to preset stereo or mono operation and set the required gain parameters within the module.

Please refer to figure 2 for the location of these adjustments and use the procedures defined in the next section to configure the D AA 5320 module.

Switch Settings

Below the switch settings for the 4-position dip-switch are defined. Please refer to figure 2 for the location of the switch. There is also a rocker style switch on the module edge for Up / Down. This switch is used for gain adjustments.

Note. The module dip-switch is not a usual implicit selection switch used to define simple functionality. Setting the module is an interactive process, which involves setting the switch state to enable the setting or adjustment of a certain parameter, and then storing settings in flash memory. Please read this section fully and review the procedures before attempting any changes to the module settings.

Switch	Setting	Function
1	ON	Enable Local Adjustment
	OFF	Disable Local Adjustment
2	ON	Stereo mode 2 x 1:4
	OFF	Mono mode 1 x 1:8
3	ON	Unity ON
	OFF	Unity OFF
4	ON	Select RIGHT input channel
	OFF	Select LEFT input channel

Factory Preset Condition

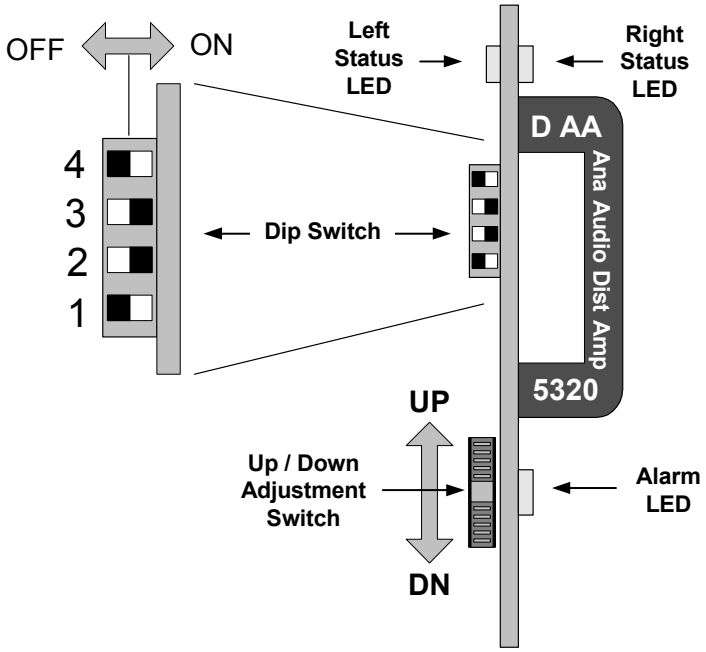
The D AA 5320/21 is delivered with stored presets for the following functionality:

Local adjustment: **Enabled**
Mode: **Stereo**
Adjustment: **Gang Mode**
Gain Setting: **Unity OFF(0dB both channels)**
Gain: Channel: **Left**

No further adjustments are needed if this is the functionality desired.

Adjustment Procedures

The modules configuration and gain settings are set using combinations of the dip-switch and the Up / Down switch on the module edge.



Setting functionality and calibration is interactive and not an implicit switch setting process. The adjustments are made through imbedded micro-controller and settings stored on internal flash ram. To simplify the configuration and setting of the module a series of procedures has been defined to make setting the module easier. These are:

- Set Stereo / Mono Mode
- Set Unity Gain (using gang mode)
- Set Unity Gain (Individual channels)
- Set Stereo Gain Levels (Using gang mode)
- Set Stereo Gain Levels (Individually)
- Set Mono Gain Level

These procedures capture most things you would need to change or set on the module.

Set Stereo / Mono Mode

The D AA 5320/21 module can be set to one of two preset modes of operation.

Stereo. This is a simple 2 x 1 to 4 amplifier. Independent left and right channels passed through the amplifier providing four balanced line outputs for each input channel.

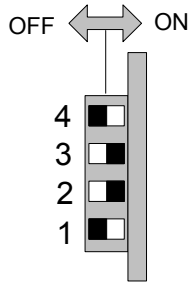
Mono. This is a simple 1 x 1 to 8 amplifier. The signal on the **LEFT** input channel is passed through the amplifier providing eight balanced line outputs of this channel.

Use this procedure to select Stereo or Mono modes of operation.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[stereo / mono select]* to ON for Stereo or OFF for Mono*
3. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
4. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF

* When in mono mode the RIGHT channel indicator will go out.

Note. Diagram only shown for switch location reference not actual settings



Set Unity Gain (using gang mode)

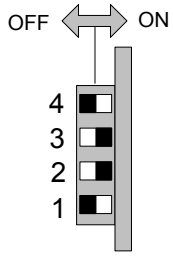
Setting unity gain with gang mode enabled allows the retention of any relative gain offset that may have been set previously between the channels. Setting unity will take the higher of the two channels to unity (0dB) the other channel will retain its relative negative offset.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[Stereo / Mono Select]* to ON
3. Set Switch 3 *[Set Unity]* to ON
4. Select Gang Mode: * Toggle Switch 4 *[channel Select]* twice within 2 seconds. (Both channel LEDs will flash yellow once at the same time)
5. Push either the UP or DN push button once, this will set the higher of the two channels to unity gain (0dB) The other channel will retain its previously stored relative offset (if any)
5. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
6. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF.

* Gang mode of operation simply couples the two channels together for adjustment purposes. If there was a previously stored gain offset between left and right channels, gang mode will keep the offset and perform a uniform adjustment to both channels preserving the previously stored offset.

To disable gang mode change the state of Switch 4 *[channel select]* once. The channels can now be adjusted on an individual basis.

Note. Diagram only shown for switch location reference not actual settings



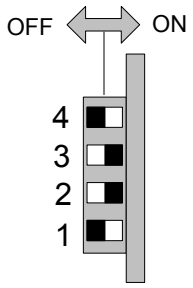
Set Unity Gain (Individual channels)

Use this procedure if you wish to individually set a single channel or both channels back to unity gain.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[Stereo / Mono Select]* to ON
3. Set Switch 3 *[Set Unity]* to ON
4. Select input channel by setting switch 4 *[channel select]* ON for right channel or OFF for Left channel. *
5. Push either the UP or DN push button once, this will set unity gain in the selected channel.
6. Select the other input channel and repeat steps 4 and 5 above.
7. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
8. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF

* toggle this switch once this will clear gang mode if previously set. The selected channel status LED will flash yellow once when channel is selected.

Note. Diagram only shown for switch location reference not actual settings



Set Stereo Gain Levels (Using Gang Mode)

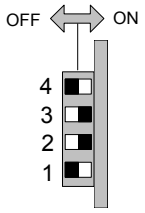
When using the amplifier in a stereo application you may want to use the gang mode to couple the left and right channels together so a single adjustment will adjust both channels simultaneously.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[Stereo / Mono Select]* to ON
3. Set Switch 3 *[Set Unity]* to OFF
4. Select Gang Mode: Toggle Switch 4 *[channel Select]* twice within 2 seconds. (Both Channel LEDs will flash yellow once at the same time)**
5. Push DN or UP buttons to adjust gain level. Each press changes the gain by 0.5dB, holding the button down will change the gain in a fast mode.
6. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
7. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF

*To disable gang mode change the state of Switch 4 *[channel select]* once. The channels can now be adjusted on an individual basis.

** Gang mode of operation simply couples the two channels together for adjustment purposes. If there was a previously stored gain offset between left and right channels, gang mode will keep the offset and perform a uniform adjustment to both channels preserving the previously stored offset.

Note. Diagram only shown for switch location reference not actual settings



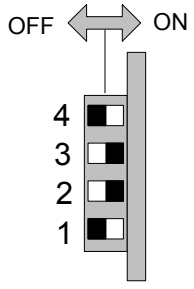
Set Stereo Gain Levels (Individually)

When using the amplifier in stereo applications you may want to set different gain levels for the right and left channels. This procedure shows how to set the channel gains individually.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[Stereo / Mono Select]* to ON
3. Set Switch 3 *[Set Unity]* to OFF
4. Toggle switch 4 *[channel select]* once to make sure gang mode is cleared.
5. Select input channel by setting switch 4 *[channel select]* ON for right or OFF for Left. *
6. Push the DN or UP buttons to adjust gain level. Each press changes the gain by 0.5dB, holding the button down will change the gain in a fast mode.
7. Select the other input channel and repeat steps 5 and 6 above.
8. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
9. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF

* Toggle this switch once, this will clear gang mode if previously set. The selected channel status LED will flash yellow once when channel is selected.

Note. Diagram only shown for switch location reference not actual settings



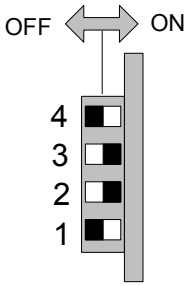
Set Mono Gain Level

When in mono mode the Right input channel is sent to all 8 audio outputs. Please follow the procedure below to set the gain in Mono mode.

1. Set Switch 1 *[enable local adjustment]* to ON
2. Set Switch 2 *[Stereo / Mono Select]* to OFF *
3. Set Switch 3 *[Set Unity]* to OFF
4. Push DN or UP buttons to adjust gain level. Each press changes the gain by 0.5dB, holding the button down will change the gain in a fast mode
5. If 10 seconds pass with no further adjustments being made both channel status LEDS will flash yellow four times. This confirms settings have been written into flash ram and stored.
6. To prevent further accidental adjustment it is recommended to set Switch 1 *[enable local adjustment]* to OFF

* When is mono mode the RIGHT channel status LED will go out.

Note. Diagram only shown for switch location reference not actual settings



Auto Store

If no parameters are changed for 10 seconds then the current settings will be written into flash memory automatically, this can be seen by the channel condition LEDS flashing yellow four times.

Alarm/LED Status Indicators

The D AA 5320/21 module has LED indicators that serve as alarm and status indication for the module. Function is described below.

The Indicators are found on the front edge of the module PCB. Status indicators are at the top and the alarm LED is at the bottom. (Figure 2)

Channel Condition Indicators

One LED is provided for each channel **IN Left** and **IN right.** Function described below:

LED Color	Indication
Green	Signal Present
Yellow	Set up aid. Flashes during set up to indicate and confirm various operations. *(Refer to set up procedures for details).*
Red	No Input

Front Panel Alarm Indicator

There is also a single alarm LED on the module, (figure2) which is designed for quick and easy indication of a problem condition and is visible through the front cover of the card frame.

LED Color	Indication
Green	Signal Present. Monitors both channels if is stereo mode, right only if in Mono mode
Red	Audio Input Missing. Monitors both channels if is stereo mode, LEFT only if in Mono mode
Off	Power Supply Fault

Normal status is **GREEN**

Locate Function

For larger systems which may have multiple cards of the same type in a single rack, or multiple rack systems on a large central control system we have added a useful utility which will help to visually locate a suspect module quickly (When used in conjunction with the optional control system and software)

Once the specific module has been selected on the control system there is a locate button on the top of the GUI:

Locate Function in Control System

When Locate is selected the status indicator on the GUI and the module LED's will flash yellow in the following continuous sequence.

3 short flashes…. Pause…. 3 short flashes …

This uses the alarm LED located on the front of the module and in some cases any channel or status LED's that may be used in the module.

Use of the locate function will not interfere with the normal operation of the module.

For more details on this feature please check the documentation supplied with the controller software.

Specifications *(D AA 5320/21)*

Inputs

Signal	1 or 2 (switchable) balanced analog audio
Input Impedance	20K Ohms
Max input level	+ 26dBu (D AA 5320) + 20 dBu (D AA 5321)
Connection	SubD 15 pin female(D-type) or 2 x WECO (S-type)

Outputs

Signal	8 balanced audio outputs
Output Impedance	< 50 Ohms
Max Output Level	+ 26dBu (into 10K Ohm) (D AA 5320) + 20 dBu (into 10k Ohm) (D AA 5321)
Connection	SubD 25 pin female (D-type) or 8 x WECO (S-type)

Operating Modes

Stereo	1 stereo pair input with 4 stereo pair outputs
Mono	1 mono input with 8 mono outputs

Performance

Gain Level Range	-90dBu to +31dBu
Frequency Response	+/- 0.1dB (20Hz to 20KHz at 24dBu)
Distortion	<0.002% (20Hz to 20KHz at 24dBu)
S/N ratio	>98dB (20Hz to 20KHz A weighted)
Common Mode Rejection	>90dB up to 20KHz
Control	Local settings (dip switch). Remote control of module configuration (stereo/mono and gain)
Status Monitoring	Signal presence detection (signal absence: < -30dBu for 5s)

Electrical Specifications

Operating Voltage	+ 12VDC
Power Consumption	3.5 W
Connection	DC input via 5 pin locking bayonet connector
Safety	IEC 60950/ EN 60950/VDE 0805/UL1950

Mechanical

Size	283mm x 78mm
Weight	Card module D AA 5320: 120g Card module D AA 5321:450g Connection panel 50g

Ambient

Temperature	5°C to 35°C Maintaining specifications -20°C to 70°C Storage
Humidity	Max 80% non condensing

Supplied Accessories

Documentation	DAA 5320/21 Reference Manual

Available Options

Below is a list of related products for the D AA 5320/21 CardModule. Please refer to product brochures or our web site for more detailed information.

Model	Description
R FR 5010	**Series 5000 Rack Frame (empty) with single power supply**
R FR 5011	**Series 5000 Rack Frame (empty) with single power supply and front cover with integrated fans**
R PS 5010	**Redundant power supply for the R FR 5010 Card Frame**
R CT 5030	**Maste controllerwith TCP/IP Interface for the R FR 5010/5011 Card Frame**
R CT 5020	**Rack controller for the R FR 5010/5011 Card Frame**
R CT 5010	**Rack Bus Extension for the R FR 5010/5011 Card Frame. In combination with R CT 5020/R CT 5030**

Parts List

Due to the very dense design and miniature surface mount technology the module is not field serviceable. The information for a replacement assembly is below.

D AA 5320 D CardModule (complete)

Description	Analog Audio D Amp
Model Number	D AA 5320 D
Part Number	4.155.008.243

Sub Assemblies:

D AA 5320 Processing Board only (BS 5014 B)

Part Number	4.155.003.251

Rear Connection Panel for D AA 5320D (MA 5010_B)

Part Number	6.155.008.245

D AA 5320 S CardModule (complete)

Description	Analog Audio D Amp
Model Number	D AA 5320 S
Part Number	4.155.008.244

Sub Assemblies:

D AA 5320 Processing Board only (BS 5014 B)

Part Number	4.155.003.251

Rear Connection Panel for D AA 5320 S (MA 5003)

Part Number	6.155.001.123

D AA 5321 D CardModule (complete)

Description	Analog Audio D Amp with transformers
Model Number	D AA 5320 D
Part Number	4.155.005.321

Sub Assemblies:

D AA 5321 Processing Board only (BS 5014 D)

Part Number	6.155.003.351

Rear Connection Panel for D AA 5320D (MA 5010_B)

Part Number	6.155.008.245

D AA 5321 S CardModule (complete)

Description	Analog Audio D Amp with transformers
Model Number	D AA 5320 S
Part Number	4.150.005.321

Sub Assemblies:

D AA 5321 Processing Board only (BS 5014 D)

Part Number	6.155.003.351

Rear Connection Panel for D AA 5320 S (MA 5003)

Part Number	6.155.001.123

Service

If you are experiencing problems, or have questions concerning your D AA 5320/21 CardModule please contact your local distributor for assistance.

We offer a fixed cost service exchange program for defective Series 5000 CardModules out of Warranty. Please contact your distributor or check our web site for details on this program.

More detailed information and product updates may be available on our web site:

www.lynx-technik.com

You will also find links to contact us directly for assistance.

Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

Address	LYNX Technik AG Brunnenweg 3 D-64331 Weiterstadt Germany.
Website	www.lynx-technik.com
E-Mail	info@lynx-technik.com

LYNX Technik manufactures a complete range of high quality modular products for broadcast and Professional markets, please contact your local representative or visit our web site for more product information.

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