

J C F A U D I O
LAT DAC

LAT MANUAL 1.0



JCF AUDIO, LLC.

11247 CAMARILLO ST.

NORTH HOLLYWOOD, CA 91602

WWW.JCFAUDIO.COM

contact@jcfaudio.com

LAT

Safety Information

Do not repair, modify, service this device except in the manner in which it is described in this manual. Doing so can void the warranty.

JCF Audio, LLC accepts no responsibility for legal actions or for direct, incidental, or consequential damages that may result from improper installation, configuration, or use of the LAT.

Overview

The LAT is a High-Resolution 2 channel Digital to Analog converter for the 500 series format that follows somewhat in the lineage of the DAC section of the Latte.

The unit is a two-slot device and receives the industry standard AES/EBU protocol through either 500 series inputs. Dual-wire configuration is available as well. The LAT can derive its sync/data source at all pro speeds from either of the AES/EBU input sources, the Pin 6 buss when streaming is not active, or the internal reference of the streaming module. The left-hand side of the unit's AES/EBU input becomes an output by default when not selected as the active input source. This signal can be utilized with a simple XLR adapter in the case of XLR connections if applicable. The large "R" denoting "right" input and the small "r" denoting "r"emote source/output selection if connected to the forthcoming JCF Audio Somta modular monitoring system.

PEP processing is not standard on the LAT but can be installed and configured to be used or not under one of the generic A or B functions on the front panel. All available input streams can be processed with PEP if PEP is installed and selected to be engaged.

The analog outputs on the LAT are available in two different forms. Transformer coupled fully-floating outputs OR an RC coupled “quasi-balanced” output aimed at monitoring applications. It’s important to highlight the quotes here as there isn’t anything quasi about “quasi-balanced” outputs. They’re balanced. Both output styles are well-suited for studio environments and switching between them can be assigned to one of the **A** or **B** functions on the front panel as well. The “quasi-balanced” output has 6dB less output level hence the reduced scale markings on the stepped attenuators. That’s right folks. Transformers on switches....Hell freezes over...at least for this one special purpose.

The headphone amplifier has two output jacks and can feed a lot of current to whomever is listening so users please be careful with your hearing. The 500-series inputs can be routed to be two analog input sources to the headphone output. The level is controlled by the potentiometer while the DAC is doing other things with either the pin6 buss input or the streaming module and the combination of the steps and trimmers. In fact, a number of combinations of the two attenuator styles, analog and digital inputs, and both output ports are available and are discussed in the tables later in this manual.

A configurable output pad is also on-board for direct interface with power amps or powered speakers. The pad is selected with jumpers for one of three different amounts of attenuation and applies for either output type.

0 dBu is referenced to 0.775 vrms for this manual

Front Panel Controls

Level - These level adjustments at the top of both sides of the unit are graduated in 1dB steps. Accompanying these controls are two vernier trimmers accessible through holes in the front panel. The trimmers provide approximately 1dB of adjustment in each direction to center the scale. The 11 step scale covers a sensible range of calibration levels for both transformer and “Quasi-balanced” styles. Calibration and max/min level details are listed in the **Specifications** section.

Input - The middle right hand switch selects the source for the unit. The selections are the **L** denoting the presence of AES/EBU at the left rear input, **R/r** denoting the expected presence of a valid AES/EBU signal at the right input, and **Str** denoting the use of a valid AES signal on pin6 if the streaming module is offline or the direct use of the streaming module while active.

Function - The middle left hand switch has two programmable functions **A** and **B**. The no-function position is in the middle at **0**. Functions **A** and **B** can be chosen to be two or more the following possibilities with some restrictions that are detailed in the charts in a later section of the manual: Activation of the rear inputs as analog inputs to feed either attenuator, DAC digital filter sharpen, the selection of transforming coupling at the output or absence thereof, and PEP in and out if applicable.

Potentiometer - This control always adjusts the level of output at the headphone jacks. This control in some jumper configurations also controls the main output level.

Headphone Jacks - Both jacks are available with identical signals to feed one or more sets of headphones.

Edge Connections

- Pin 1: Chassis
- Pin 2: Analog Output +
- Pin 3: n/c
- Pin 4: Analog Output -
- Pin 5: Circuit Common
- Pin 6: Digital Input 1/ Reset Synchronizer 2 / No Connection
- Pin 7: n/c
- Pin 8: Digital Input/Output, Analog Input -
- Pin 9: n/c
- Pin 10: Digital Input/Output, Analog Input +
- Pin 11: n/c
- Pin 12: +16v
- Pin 13: Circuit Common
- Pin 14: -16v
- Pin 15: n/c

Adheres to the 500-series framework

There are on-board extensions to the above framework but none of them are enabled for pro use.

Specifications

D/A Calibration Range:

MAIN OUTPUT (Jumpered for potentiometer source) - "Quasi-balanced" out

MIN	MAX
Pot fully counterclockwise	Pot fully clockwise
0dBFS = No output	0dBFS = +22.8dBu MOBC / +1.2 over clip
-18dBFS = No output	-18dBFS = +6dBu

MAIN OUTPUT (Jumpered for potentiometer source) - Transformer out

MIN	MAX
Pot fully counterclockwise	Pot fully clockwise
0dBFS = No output	0dBFS = +28.8dBu MOBC / +1.2 over clip
-18dBFS = No output	-18dBFS = +12dBu

HP OUTPUT

MIN	MAX
Pot fully counterclockwise	Pot fully clockwise
0dBFS = No output	0dBFS = +21.5dBu (2.3W MAX/37 Ohms)
-18dBFS = No output	-18dBFS = +3.5dBu (37mW / 37 Ohm)

MAIN OUTPUT (Stepped attenuator and vernier) - "Quasi-balanced" output

MIN	MAX
Stepper fully counterclockwise	Stepper fully clockwise
0dBFS = +12dBu	0dBFS = +22dBu
-8dBFS = +4dBu	-18dBFS = +4dBu

MAIN OUTPUT (Stepped attenuator and vernier) - Transformer output

MIN	MAX
Stepper fully counterclockwise	Stepper fully clockwise
0dBFS = +18dBu	0dBFS = +28dBu
-8dBFS = +10dBu	-18dBFS = +10dBu
-14dBFS = +4dBu	-24dBFS = +4dBu

Vernier allows for +/-1.5dB adjustment from above values.

De-Emphasis is not available in the LAT.

Power Consumption:

< 7 Watts

Analog Output Impedance:

No pad condition:

"Quasi" out: 200 Ohms (100 per leg)

Transformer output: ~200 Ohms floating

-20 pad condition: 154 Ohms

-30 pad condition: 40 Ohms

THD+N: (DAC to Main output, -18dBFS to +4dBu alignment)

(400Hz and 30k BW lim 1x)

1kHz -18dBFS yielding +4dBu : ≤ -78 dB (.01%)

1kHz -8dBFS yielding +14dBu : ≤ -86 dB (.004%)

(400Hz and 30k BW lim 2x)

1kHz -18dBFS yielding +4dBu : ≤ -76 dB (.012%)

1kHz -8dBFS yielding +14dBu : ≤ -85 dB (.004%)

(400Hz and 30k BW lim 4x)

1kHz -18dBFS yielding +4dBu : ≤ -74 dB (.015%)

1kHz -8dBFS yielding +14dBu : ≤ -83 dB (.005%)

(No measurement filters 1x)

1kHz -18dBFS yielding +4dBu : ≤ -45 dB (.45%)

1kHz -8dBFS yielding +14dBu : ≤ -54 dB (.15%)

(No measurement filters 2x)

1kHz -18dBFS yielding +4dBu : ≤ -60 dB (.075%)

1kHz -8dBFS yielding +14dBu : ≤ -70 dB (.025%)

(No measurement filters 4x)

1kHz -18dBFS yielding +4dBu : ≤ -70 dB (.025%)

1kHz -8dBFS yielding +14dBu : ≤ -80 dB (.008%)

Input Impedance

Digital: 110 Ohms floating rear, pin6: 75 Ohms

Analog: 30k (CM)

Frequency Response (relative to 0 dB @ 1k):

48kHz :	20Hz +0.1dB
	20kHz -1.1dB
96kHz:	20Hz +0.1dB
	20kHz -1.1dB
	30kHz -2.3dB
	40kHz -3.7dB
192kHz	20Hz +0.1dB
	20kHz -1.1dB
	50kHz -5.0dB
	70kHz -7.8dB

Shipping weight

4 lbs. 11"X 11"X 6"

Notes:

The LAT harbors a Squeezebox computer module the operational details of which are freely available online. It is configurable via WI-Fi and will conform to all networks for audio data transfer, streaming control, real-time SRC, output speeds, timeout constants, and Bluetooth/AirPlay/Cspot setup. In order to use this module “**Str**” as a source must be selected for it to be enabled. The biphasic output should be used and users can email us for tips on setting this up. As of the time of this manual the module works best with an LMS server running on a network available to the module. It’s a pretty fantastic arrangement with plugins for all of the streaming services you’ve heard of and use.

Usage

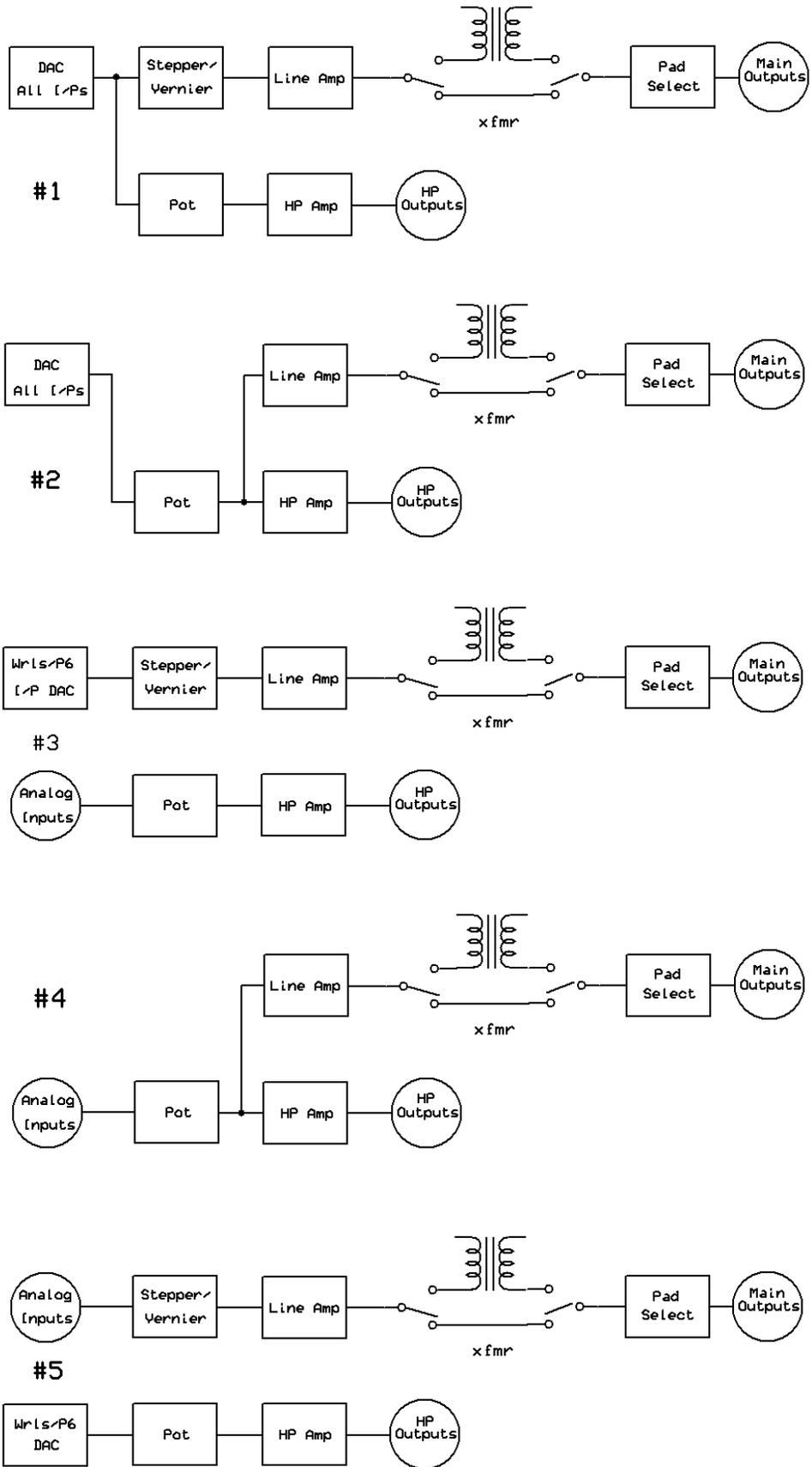
AES/EBU outputs are industry standard and can be attached to many pro devices and consumer interfaces with ease. It’s important to note that S/Pdif and AES/EBU, whilst having differing operating levels and characteristic impedances by the book, can be used interchangeably in most situations with short, direct cabling.

The 500 format pin 6 was initially specified for interconnecting two or more modules together usually for exchanging side-chain information in stereo processing. Since most modern racks have the ability to segment the pin 6 buss however the user desires, it is employed here as a generic single connection buss for exchanging digital data and sync information. When the streaming module is disabled (**L** or **R/r** input selected) or if the streaming module is on but in its inactive state (**Str** selected and no data has come from the LMS server yet or in the last period of time equal to the timeout value), pin6 can be an AES/EBU source (the USB return stream of the TE2 for example) to the DAC. Older racks without this functionality may either have their entire buss tied across the whole rack with or without the ability to user to adjust. If a situation arises where pin 6 cannot be used or is occupied for other reasons, there are two on-board jumpers to disconnect the LAT from buss/ pin 6 from either card. They are located close to pin 6 and only one (or zero) of them can be installed at any time.

The red led indicates a sync error or idle state if “**Str**” is selected.

The combination of the main configuration function and jumper settings allow for the unit to be used as a standalone DAC, standalone line amp, standalone headphone amp, or the relevant combinations of both.

Below highlights the 5 workable unit configurations:



The main configuration function can only be assigned to the “B” front panel control.

If the Line Amp input jumper “LA” is selected as stock to “sv”, configuration #1 can be rapidly switched to #3 respectively without reconfiguring manually. The unit comes stock with “B” switching from #1 to #3 configuration. (Also the unit can be fixed in #1 operation by not populating any jumper positions in 1-4 on both cards or fixed in #3 operation by populating jumper position 3 on both cards if on-the-fly switching isn’t needed)

If the Line Amp input jumper “LA” is changed to “p” that would enact form #2 normally and the main configuration function would then switch it to form #4. This is with left card jumper position 1 and right card position 4 selected as it is stock.

If the stock jumper settings of 6 and 8 are changed to 5 and 7, that would select for the configuration moving between #1 and #5. The line amp jumper “LA” should remain in “sv” in this mode otherwise redundancies occur.

With the LAT connected to the 10-pin SOMTA header the rear XLR inputs cannot be used as analog inputs and there is a jumper (marked “extanain” on the right-hand card under the cover plate) to disconnect this action from the main configuration function. Both rear XLR inputs then remain active for AES input ability removing the limitations on what inputs are available to be selected for the DAC in configuration #3. Only configurations #1 and #3 would be applicable in this setup with the SOMTA monitor buss taking the place of “Analog Inputs” in the diagrams.

A bit complex, but fear not. Just email us with any questions. The #1-#5 diagram says most of what you need to know.

Jumper Controls

Assignable Function	A	B
Transformer In/Out	X (default)	
Main Config Change		X (default)
PEP In/Out	X	X
Digital Filter Sharpen	X	

The “xfmr” jumper can be set to the “sw” position for front panel control “A”. This controls insertion of the output transformers. It can also be moved to the “on” position

so that the transformers are in at all times. The jumper is visible under the cover plate right near the transformer itself.

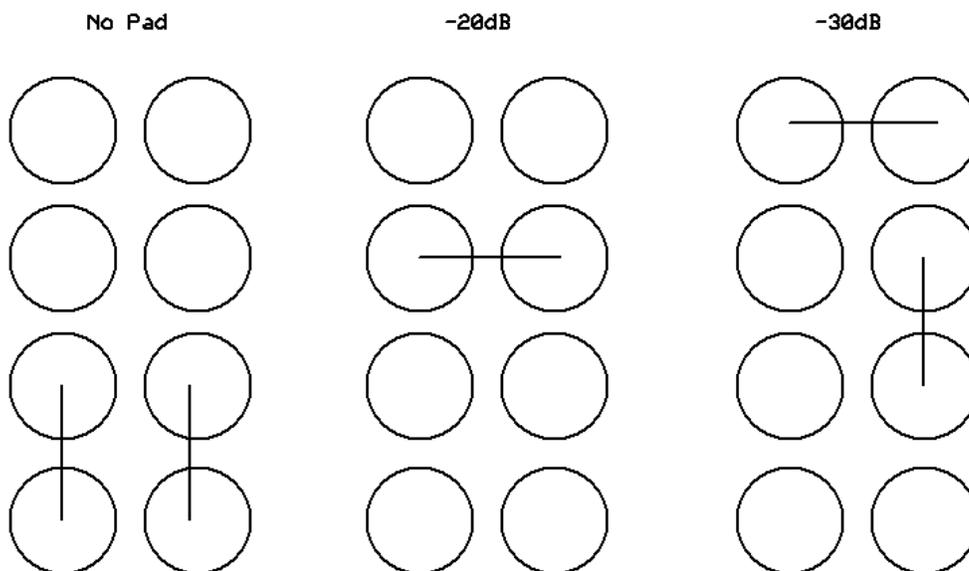
The Lat as new ships with the main configuration function (#1/#3) assigned to “B” and the transformer in or out selection function assigned to “A” and no pad selected, so please be careful before connecting power amps and/or powered speakers.

The steeper DAC filter slope can be assigned to function “A” or manually selected to be on, or off. Important to note that this extends the group delay of the unit from 20 to 57 samples and is quite a pain to reach because it’s on the left-hand side card in the middle. It is visible looking down inside from the top.

If the PEP module is installed, PEP on can be assigned to “A” or “B” or fixed on or fixed off. These jumpers are labeled and visible on the right-hand card near the front panel at the bottom edge.

The functions listed in the table can be grouped together on either the “A” or “B” busses if multiple things changing at once is desired.

The pads can be selected for each channel on their respective cards. -20, and -30 are the possible settings that stay inline and apply for the XLR outputs and must be selected manually. They are located at the rear near the edge connector outputs on each card and can be accessed without removing the cover.



Feature list

- No AI
- Low group delay
- Sleek Dual 500 slot design
- Selectable output type and level to suit job
- < 7W consumption
- PEP processing optional
- 2 Year Limited Warranty

FCC Compliance:

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.

Warranty

JCF Audio 2-Year Limited Warranty

JCF Audio LLC. "JCF Audio" warrants this product to be free of defects in material and assembly for a period of two years for parts and labor from the date of original purchase. This warranty is enforceable only by the original retail purchaser and cannot be transferred or assigned without express permission of JCF Audio.

During the warranty period JCF Audio shall, at its exclusive option, either repair or replace free of charge any product that proves to be defective on inspection by JCF Audio or its authorized service representative. In all cases disputes concerning this warranty shall be resolved as prescribed by law. To obtain warranty service, the purchaser must contact JCF Audio to obtain instructions where to send the unit for service. All authorized returns must be sent to JCF Audio or an authorized JCF Audio repair facility postage prepaid, insured and properly packaged. This warranty does not cover claims for damage due to abuse, neglect, modification or attempted repair by unauthorized personnel, and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

Proof of purchase must be verified in the form of a bill of sale or some other positive proof that the product is within the warranty period upon JCF Audio's request.

JCF Audio reserves the right to update any unit returned for repair. JCF Audio reserves the right to change or improve design of the product at any time without prior notice.

Any implied warranties including implied warranties of merchantability and fitness for a particular purpose are limited in duration to the length of this limited warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

JCF Audio will not be liable for incidental, consequential, indirect or other damages resulting from the breach of any express or implied warranty, including damage to property, damage based on inconvenience, downtime, loss of personal property, and to the extent permitted by law, damages for personal injury or death.

Some states do allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This warranty only applies to products sold in the United States of America. The terms of this warranty shall only apply within the country of sale. Without limiting the foregoing, repairs under this warranty shall be made only by a duly authorized JCF Audio service representative or by JCF Audio itself. For warranty information in other countries, please refer to the dealer or distributor.