

Little Labs

AES Digital Audio Mastering Router



Operators Manual

Dear Audio Professional,

Congratulations on your purchase of the Little Labs Digital Audio Router. This Digital Audio Router was initially developed by myself while working for the now defunct A&M Studios & Mastering (The old A&M Chaplin lot is now the happy home Of Kermit the Frog aka The Jim Henson Company). It was needed, and therefore designed, because all the digital audio routers available failed in our critical listening tests. All routers, detanglers, distributors designed for digital audio, that we tested, left a footprint on the sound. We wanted one that sounded exactly as if you hooked up, between two pieces of gear, one good "wide eye" style 110 ohm AES cable. Some boxes available had some great flexibility, oh they eliminated the physical "tangle", but at the expense of a mental tangle, the dreaded heirarchical menu or multi sequence button pushing (Oh I know, make a macro it's easy, yeah right, using the "UFC" is always a breeze), I just wanted to push one damn button! Well I researched and came up with, utilizing some hard work & a little luck, a totally transparent Digital Audio Router. This Digital Audio Router was approved by the absolute finest Mastering Engineers (Stephen Marcussen & Dave Collins, two hear a flea fart golden ears) and also had the ease of use that a completely stoned assistant engineer can function with at 4:30am.

The latest Digital Audio Router has been further refined both cosmetically and electronically from the original A&M model. The router though is still hand made to the highest standards. It uses a 4 layer circuit board, all AES ins and outs are transformer coupled. All AES outputs if not selected are properly terminated (nothing else out there does that). You will experience no switching pops. You may use high sample rates and 24 bit digital audio with no sacrifice in performance. All flags & clocks remain intact while passing through this router. You can use this router with absolute confidence that you are not sacrificing a thing. This is **the** router for critical Mastering purposes.

I would like to give credit for help & good ideas in developing the ergonomics of this product to the old staff at A&M (circa 1995). I think I was supposed to buy Jim Labinski and Chad Bamford an IN & OUT burger for their suggestions and never did...

Cheers,

Jonathan Little

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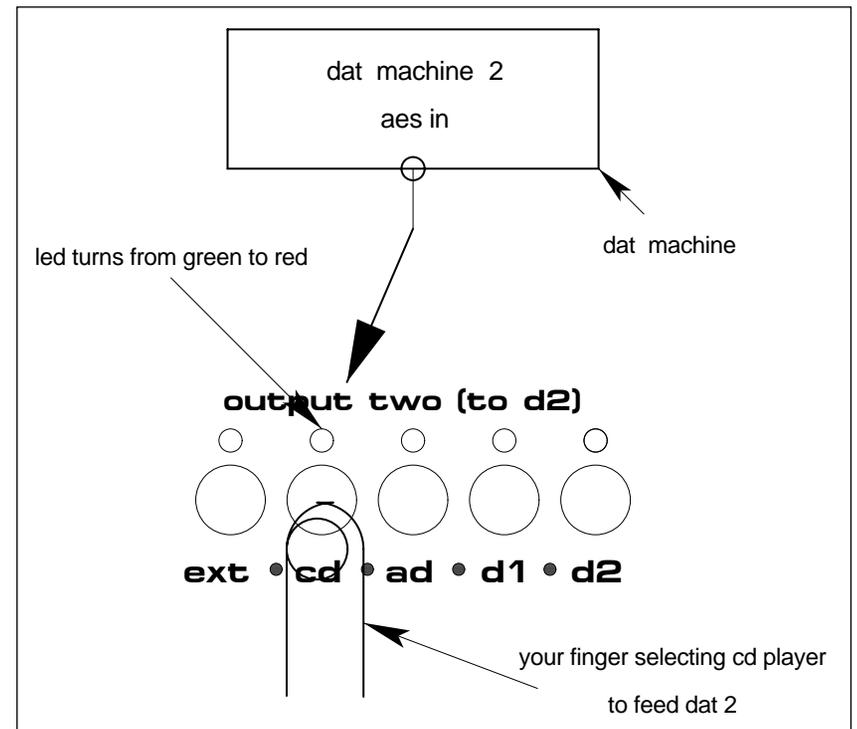
THE POWER SUPPLY SUPPLIED WITH THE DIGITAL AUDIO ROUTER

Only use the 5v power supply supplied with the router. This supply is a regulated linear supply which was chosen especially for this application. Other supplies with similar current ratings, especially switching supplies will greatly degrade the sonic quality of the digital audio passing through the router. Switching supplies can interfere with digital clocks causing intermittent and frustrating locking problems in your studio. If you lose your supply call little labs for a replacement.

GROUND LOOPS AND USING THE DIGITAL AUDIO ROUTER TO GET RID OF THEM

When interfacing equipment whether digital or analog there is always a possibility a ground loop will occur causing an annoying buzz. If when disconnecting one or more digital ins or outs from the router the buzz goes away, there is a solution. Each xlr connector on the router has an internal removable blue jumper located directly behind it. Removing this internal blue jumper disconnects xlr pin 1 ground and transformer isolates that input or output. Narrow down which connection causes the buzz for example lets say d2 in, open up the top (see inside access for how to do this) remove the jumper behind that xlr (put the jumper in the opposite position for storage) and your buzz should be gone. This should eliminate your ground loop.

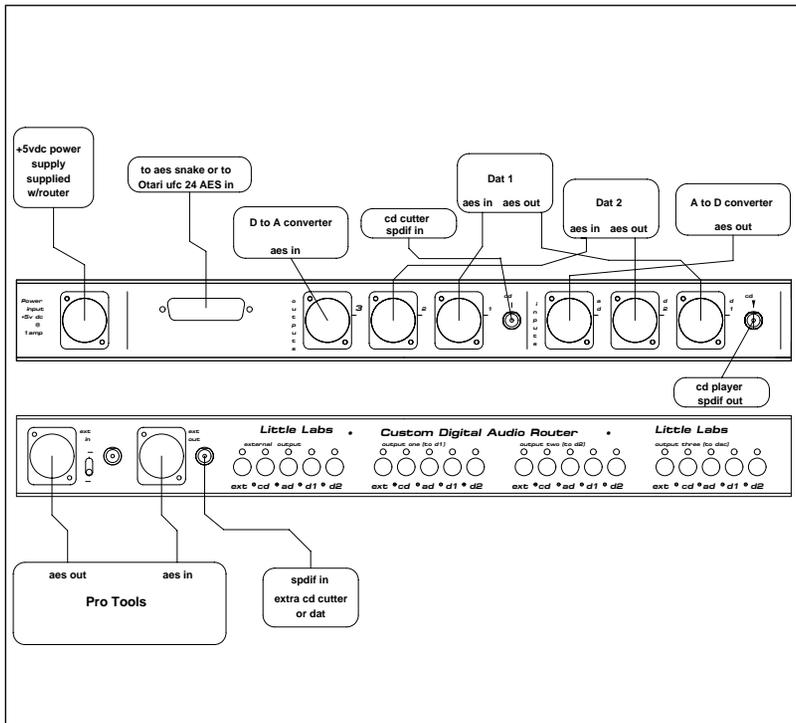
How to Route your Router EXAMPLE A



Each output has a bank of five switches to select what feeds it (this bank of switches is actually a one of five interlocking selector switch, only one button is mechanically allowed to be pushed at once). The led above the selected switch turns from green to red. In this example the cd player is selected to feed dat machine 2s aes input.

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How to Route your Router EXAMPLE B



Here is a simplified diagram to quickly show you how the average studio set up has everything plugged in. Note the front panel external ins & outs this makes it extra convenient when rolling in pro tools or an extra dat machine.

INSIDE ACCESS

When opening the guts of a product, you always run the risk of doing something so as the product never quite works right again. Please refer to qualified service personnel, no user serviceable parts inside. I can always tell if someone opened up one of my products. But I myself usually won't even buy something until I open it. So here is how to do it without screwing it up, Fortunately this is my easiest product to open up to date.

1. Remove the 4, 4-40 screws on the top panel, lift up panel.

Nicely made huh?

2. For access to the bottom of the pcb just remove the bottom 4, 4-40 screws and lift off the panel.

That is all,

pretty simple huh??

To date I have not had to do any service on a Little Labs Digital Audio Router. It is an extremely reliable device and I doubt you will ever have any service problems with normal use.

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GENERAL INFORMATION

To be kept informed of new Little Labs products and Little Labs product updates, please drop us a postcard or E-mail. Please include your name, address, which product you bought and where you purchased. Also, any comments or suggestions are always welcome.

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ORDER LINE IN USA EXCEPT ALASKA:
800-642-0064

NOTES ON AES AND SPDIF AND WHY LITTLE LABS CHOSE TO "LEAVE THE BITS ALONE"

**Spdif output on the Little Labs Router is not true to spec spdif. Rather than reclocking and changing bits for the consumer world, after much investigation it made more sense to keep the bits (and clock) intact and transmit a true 75 ohm coaxial version of AES, similar spec to AES 3-id. For more information on the difference between spdif and AES read on. This is a revised version of what can be found on the web site of Tomi Engdahl at the Helinski School of Technology.

The interface:

IEC958 is a newer standard which supersedes AES/EBU and also S-PDIF. The S/PDIF interface (IEC-958) is a 'consumer' version of the AES/EBU-interface. The two formats are quite compatible with each other, differing only in the subcode information and connector. The professional format subcode contains ASCII strings for source and destination identification, whereas the commercial format carries the SCMS (serial copy management system).

Cabling details:

S/PDIF (IEC-958) uses 75 ohm coaxial cable and RCA connectors. 75 ohm coaxial cable is inexpensive, because it is the same cable as used in video transmission (you can buy a video cable with RCA connectors to connect your S/PDIF equipments together). AES/EBU-interface uses the well known symmetrical connections with transformer isolation and an output impedance of 110 ohm. The signal-level of this interface is reasonably higher than in the consumer version (3...10 volts). AES/EBU digital audio signals are transmitted at high, video-like frequencies (at around 6MHz) and should be handled very differently than standard analog audio lines. Commonly used XLR-3 microphone

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cables have various impedance ratings (30 ohm to 90 ohm typical) and exhibit poor digital transmission performance. The result is signal drop out and reduced cable lengths due to severe impedance mis-matching (VSWR) between AES/EBU 110 ohm equipment. It is important to use a balanced cable with an impedance rating of 110 ohms designed for transmission of digital audio.

Converting between AES/EBU and S/PDIF interfaces:

There are differences in the electrical characteristics of AES/EBU and S/PDIF interfaces: AES/EBU uses a balanced differential line based on XLR connectors and the signal levels are 5 volts. S/P-DIF uses a coaxial unbalanced line with RCA connectors and the signal levels are around 0.5 volts. The protocol used in AES/EBU and S/PDIF is not exactly the same and that can cause problems sometimes. The basic data format of AES and S/P-DIF are identical. There is a bit in the channel status frame that tells which is which. Depending upon the setting of that bit, some bits have different meanings. For example, the bits used to describe de-emphasis in the AES/EBU protocol overlap the bits used to implement the SCMS protocol in S/P-DIF land. The big problem comes in the fact that MANY consumer products out there are VERY picky about what they see in the bits, and even though a given signal may fall within the letter of the standard, some equipment will absolutely refuse to talk to it. Most professional equipment is reasonably flexible and tolerant of slight foos in the signal.

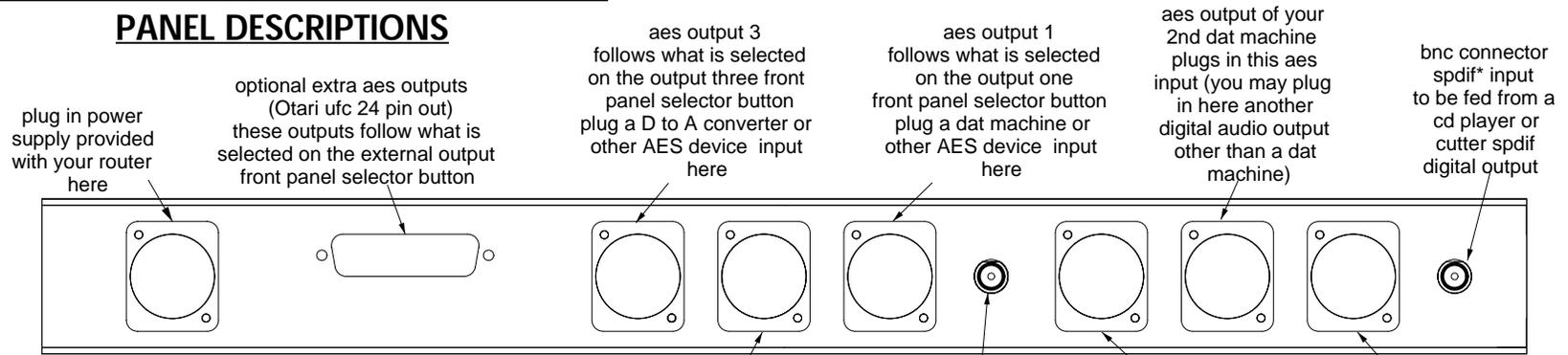
Remember that although the audio data is the same in both AES/EBU and S/PDIF interfaces, they are indeed different formats, at least in their subcode. AES converted to coax is NOT S/PDIF, and S/PDIF converted to XLR balanced is NOT AES. They are still their native format, just the transmission medium has changed. Whether they will work in your application depends on the equipment chosen.

Some DATs have a switch that selects one format or the other regardless of the physical interface, some just ignore what they don't understand (usually resulting in the generally positive benefit of ignoring SCMS encoding), and some indeed gag on the "other" format. **But simply fixing the physical interface works far more often than it doesn't.Hence the reason Little Labs chose the "leave the bits alone" approach.**

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FRONT AND REAR DIGITAL AUDIO ROUTER

PANEL DESCRIPTIONS



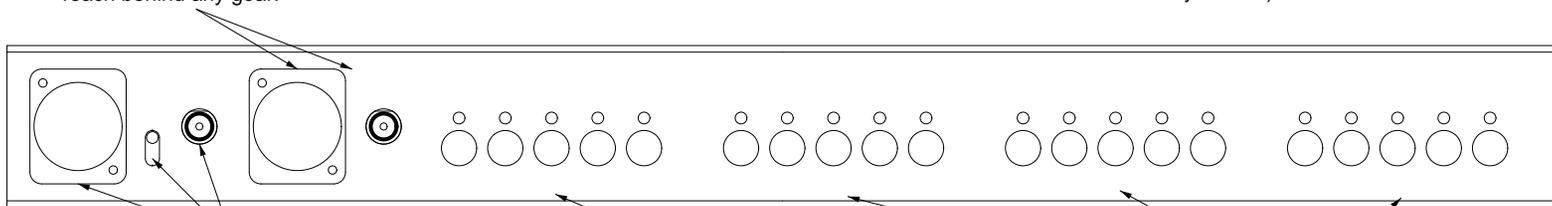
External out bnc spdif* and aes out male xlr, this output follows what is selected on the external output front panel selector button (directly to the right), both are active so you may use both, one for example to feed a cd cutter, one a dat. This is the place to hook up something rolled into your studio temporarily without having to reach behind any gear.

aes output 2 follows what is selected on the output two front panel selector button plug a dat machine or other AES device input here

bnc connector spdif* output to feed cd cutter input, this output follows what is selected on the external output front panel selector button

aes output of your A to D converter plugs in this aes input (you may plug another dat machine or another digital audio output other than an A to D converter here if you wish)

aes output of your 1st dat machine plugs in this aes input (you may plug another digital audio output other than a dat machine here if you wish)



External in toggle switch selects which input feeds the external input on the front panel selector switches, the front panel bnc spdif or the front panel aes in female xlr. This is the place to hook up something rolled into your studio temporarily without having to reach behind any gear.

The External output has a bank of five switches to select what feeds it (this bank of switches is actually a one of five interlocking selector switch, only one button is mechanically allowed to be pushed at once). The led above the selected switch turns from green to red. The external output feeds the front panel aes out male xlr, the front panel bnc spdif, the rear panel cd cutter out, and if installed the rear panel db 25 optional extra aes outputs

Output one, two and three each has a bank of five switches to select what feeds it (this bank of switches is actually a one of five interlocking selector switch, only one button is mechanically allowed to be pushed at once). The led above the selected switch turns from green to red. Each output feeds its own rear panel aes out male