ADX-120 COMMENTATOR UNIT

(Cobranet Version)

Installation and Operation Manual

Firmware Version 5.5

Lance Design / 27 Fairview Avenue / Ridgefield, Connecticut 06877
Tel: 203-894-8206 / Fax: 203-894-8207

www.lancedesign.com

WARRANTY STATEMENT

This equipment is warranted to be free of defects in materials and workmanship for a period of two years from date of delivery. Any necessary repairs resulting from defects in materials or in manufacture will be made free of charge provided that the equipment has not been subjected to mechanical or electrical abuse, or modification, as determined by Lance Design, and also that the equipment is returned to Lance Design with prior authorization.

No liability whatsoever is assumed for consequential damages resulting from the use or failure of this equipment. This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of fitness for purpose.

ADX-120 Announce Box Front Panel View

ADX-120 Announce Box Rear Panel View

ADX-2400 (Truck End)

DESCRIPTION

The ADX-120 Commentary Unit (announce box) is designed to provide an 'all-in-one' facility for live broadcast announce booth requirements, with all audio and control between the mobile unit and the booth being transported by standard Ethernet, on either copper or fiber.

A single ADX-120 unit provides the following functions:

1) Two high-quality microphone channels; one on a front panel XLR for headset use, and a second on a rear-panel XLR for a stand-up 'stick' mike, or an effects mike. The second input can also be used as a balanced line-level input. Phantom power is available for both microphone inputs.

2) A two-channel dry IFB for the announce headset. Volume controls are provided on the top of the unit for each of these two channels.

3) A two-channel wet (RTS-Format) IFB for the stand-up position. This output has enough DC current available to operate two IFB beltpacks. This output may also be switched to a dry balanced output, selectable to either of the two ifb channels. This is useful for a dry IFB beltpack, or an SA speaker or other purpose. The audio quality is very high, so this path is usable for program audio if required.

4) A two-channel wet (RTS-Format) TW intercom. There are two active hybrids in the unit, one for each channel. The truck-end connections are four-wire, and so this eliminates the need for external 4W to 2W converters. The DC current available is sufficient to operate two BP325-type beltpacks. There are noise gates on the TX side of the hybrids, so that any trans-hybrid leakage is minimized on the truck (4W) end.

5) An illuminated "Mute" button and two talkback buttons are provided for the announcer. The two talkback paths are available in the truck as either discrete outputs or mixed; i.e. all 'Talkback 1' paths mixed together, and all 'Talkback 2' paths mixed together. The button illumination is provided by RGB leds, and the on and off colors are selectable, allowing for color-coding of the button functions for the announcer's convienence. The buttons are also relegendable, so custom labels may easily be inserted.

Other features include:

1) Power provided by the ethernet connection. The ADX-120 adheres to the 802.3af POE specifications, but this standard does not allow sufficient power for four RTS beltpacks. Lance Design has available a 1RU combination swith / power supply (ADX-8000) which provides robust power for up to eight ADX-120s, with ample reserve for the full beltpack complement. This supply contains redundant, load-sharing high-efficiency power supplies with fault indication for maximum reliability.

(continued)

ADX-120 Features - continued

2) The unit is very compact, and simple to implement. In a typical application, a single CAT5E cable connects each announce box to a small enclosure which contains the power supply / Ethernet switch (ADX-8000)

3) Redundancy in the network implementation is readily accomplished. Redundant fibers, Cat5 cables, and even switches may be used. Each ADX-120 has two ethernet ports, which allow for a completely redundant network, if desired. Software in the ADX-120 looks at link status and packet reception and if the primary network fails will select the backup port automatically.

4) The audio quality is very high. The microphone preamps are extremely low-noise, transparent parts made by THAT Corp (formerly DBX), and considered to be some of the industry's best. Preamp gain is remotely-controlled over a wide range, with peak hold headroom indication provided.

   Having the preamps almost right at the microphone connector eliminates interference, capacitive roll-off, and noise caused by long cable runs. The A/D converters are highest-quality 24-bit devices, and the digital audio paths are all 20-bit uncompressed. Talkback, IFB and PL circuits are all full bandwidth, program-quality channels, so all of these paths are extremely clean, and provide excellent audio quality to the announcers' headsets and the PLs.

5) Latency through the ethernet transport is low. From the microphone connector to the audio output at the truck is approximately 2.2 milliseconds. The IFB and PL paths are the same.

Typical booth package with ADX-8000 Switch, ADX-140, and one ADX-120

System Overview

The ADX announce system consists of the following elements:

- One or more ADX-2400 frames which serve as the 'head end' or truck end of the system, and provide all inputs and and outputs for the truck or control room, and remote control of the ADX-120s and ADX-140s.

- One or more ADX-120 Announce Boxes or ADX-140 Interface Frames which function as the remote units in the booth or other remote location.

- ADX-8000 or other 48-volt power supplies as required to power the ADX-120 units. The ADX-140 and the ADX-2400 have internal AC-operated supplies, although the ADX-140 may also be powered over the CAT5 cable from an external 48-volt supply (such as the ADX-8000).

- Network infrastructure as required, consisting of standard layer-2 Ethernet switches, fiber optic elements, media converters, fiber and copper interconnects, etc. This is referred to in this manual as 'the network'.

Each ADX-2400 unit can support up to four ADX-120 or ADX-140 units, in any combination.

The remote devices are identified by the ADX-2400s by a **SYSTEM ID** number, which is set by a two-digit rotary switch on the remote device (rear panel of the ADX-120, front panel of the ADX-140). Each remote device must be set to a unique system ID (01-99).

The desired remote devices are designated in the ADX-2400 menu to be 'UNIT A', 'UNIT B', 'UNIT C' and 'UNIT D' for that ADX-2400. This is what determines the audio routing; for example which microphone signal comes out of the 'Mic A1' output of the ADX-2400. The microphone signal that comes out of that output would be the headset mic ("Mic 1") from the ADX-120 which has its system ID switches set to match the number assigned as 'Unit A' in the ADX-2400 menus.

Note that network wiring has no bearing on the audio routing. An announce box can be plugged in anywhere on the network, into any cable, and the routing will remain constant. This could be very useful if you had to move an announce position to a second location. All faders, IFBs, PLs etc. would remain the same at the second location without any duplication or re-patching/routing at the truck.

As another example, if you needed to swap the color and play-by-play positions for some reason, you could just change the System ID switches on their announce boxes. All mikes, IFBs, talkbacks, etc. would be swapped automatically.

Note that the network which connects the system components is a true Ethernet network, and may be as extensive and as distributed as required. It is not simply a point to point system. Network nodes might be in a booth, mobile unit, locker room, sideline, and interview studio; all connected by a combination of fiber and Cat5 cable.

The Truck End

ADX-2400 Front Panel

The ADX-120 Commentator Units connect via Ethernet (copper or fiber) to a standard ADX-2400 Audio Distribution unit in the truck. These units are available in either analog or AES configurations, and have been well-proven through several years of widespread application in high-end mobile units and other applications.

When the option dip switch section #3 is turned on, the ADX-2400 enters the 'announce booth mode'. In this mode, the ADX-2400 is configured for low-latency operation, and its DSPs are programmed to provide for such things as talkback selection and mixing, PL port assignments, non-interrupt ('program') selection, and IFB interrupt selection.

Each ADX-2400 can support up to four ADX-120s or ADX-140s, thereby taking advantage of all 24 outgoing paths and all 24 incoming paths. The ADX-120s and ADX-140s in use are distinguished from each other by the System ID numbers set on the switches on each unit, and are assigned to be 'Unit A', 'Unit B', 'Unit C' and 'Unit D' in the ADX-2400 menu.

Front panel metering and headphone monitoring is available for all paths.

ADX-2400N Rear Panel

All DB25 connectors are wired in the industry-standard Tascam/Pro Tools format, and breakout cables and pre-wired jackfields are available from a wide variety of suppliers. One is Audio Accessories, Inc. (www.patchbays.com)

The functional designations for the physical inputs and outputs are listed on the following pages*.

*The ADX-2400D AES Unit and the ADX-2400M MADI Unit also support the ADX-120s and ADX-140s. Please see the relevant ADX-2400 manual for more information.

The ADX-2400 Physical Rear Panel Outputs are:

Out 1	Mic A1 Out	(ADX120 Hdst Mic; ADX140 Input 1)
Out 2	Mic A2 Out	(ADX120 Rear Panel; ADX140 Input 2)
Out 3	Mic B1 Out	
Out 4	Mic B2 Out	
Out 5	Mic C1 Out	
Out 6	Mic C2 Out	
Out 7	Mic D1 Out	
Out 8	Mic D2 Out	

Out 9	Talkback Output 1	(Each physical Talkback output may be fed
Out 10	Talkback Output 2	by any of the Talkback paths from the ADX-
Out 11	Talkback Output 3	120s, or various mixes)
Out 12	Talkback Output 4	
Out 13	Talkback Output 5	
Out 14	Talkback Output 6	
Out 15	Talkback Output 7	
Out 16	Talkback Output 8	

Out 17	4-Wire PL Port 1 Out	(Each PL channel at the ADX-120/140s
Out 18	4-Wire PL Port 2 Out	may be assigned to any of the 4-wire
Out 19	4-Wire PL Port 3 Out	ports.)
Out 20	4-Wire PL Port 4 Out	
Out 21	4-Wire PL Port 5 Out	
Out 22	4-Wire PL Port 6 Out	
Out 23	4-Wire PL Port 7 Out	
Out 24	4-Wire PL Port 8 Out	

The ADX-2400 Physical Rear Panel Inputs are:

Input 1	IFB In 1	(Each IFB output at the ADX120s may be fed
Input 2	IFB In 2	from any if the eight physical IFB inputs)
Input 3	IFB In 3	
Input 4	IFB In 4	
Input 5	IFB In 5	
Input 6	IFB In 6	
Input 7	IFB In 7	
Input 8	IFB In 8	

Input 9	PGM In 1	(Each PGM output at the ADX120s may be fed
Input 10	PGM In 2	from any of the eight physical PGM inputs)
Input 11	PGM In 3	
Input 12	PGM In 4	
Input 13	PGM In 5	
Input 14	PGM In 6	
Input 15	PGM In 7	
Input 16	PGM In 8	

Input 17	4-Wire PL Port 1 In	(Input side of 4W PL Interface. See above)
Input 18	4-Wire PL Port 2 In	
Input 19	4-Wire PL Port 3 In	
Input 20	4-Wire PL Port 4 In	
Input 21	4-Wire PL Port 5 In	
Input 22	4-Wire PL Port 6 In	
Input 23	4-Wire PL Port 7 In	
Input 24	4-Wire PL Port 8 In	

Note that there are **routers** in the ADX2400 for the following:

- **Talkback** paths from the announce boxes to physical Talkback outputs. Mixes may also be selected so that external talkback mixing is not required.

- Physical **IFB inputs** at the truck to the various IFB outputs on the ADX-120/140 units. One physical input may feed multiple IFB outputs.

- Physical **PGM inputs** at the truck to the various PGM outputs on the ADX-120/140 units. One physical input may feed multiple PGM outputs.

- Four-wire **PL Ports** to the various PL channels on the ADX-120/140 units. Any PL channel on the ADX-120/140s may be assigned to any four-wire port. The appropriate mix-minus signals will automatically be generated, similar to the 'party-line' function in the Adam intercom systesm.

This routing is controlled by the 'SOURCE' selections on the ADX-2400 for the various outputs. See the configuration section for more information.

Remote Control

The ADX-120 announce boxes support full remote control from the truck via the ADX-2400 front panel. The following parameters are controlled:

- Microphone preamp gains for both mic preamps. A dynamic peak-holding headroom display is provided to aid in determining proper gain settings for a given microphone and announcer.
- Selection of Headphone mode (stereo, mono, etc.)
- Selection of mic or line input for the mic 2 input
- Selection of phantom power for each mic
- Selection of headphone volume range (to adjust for high or low headphone impedence)
- Selection of wet or dry mode and source for the rear-panel IFB 2 connector
- Selection of button illumination color for the panel buttons
- Selection of button mode; either momentary or 'smart' latching
- Status reporting of PL and IFB currents and voltages, temperature, and ethernet port status.

System Configuraton

Configuration of the system takes place both in the ADX-2400 and in the remote devices (ADX-120/140) themselves. This configuration is all done from the ADX-2400 front panel.

There are three catagories of configuration:

1. **The ADX-2400 Menu Configuration**

   This is where the remote devices are assigned to be Units A, B, C, and D. There are no other config items except for saving and recalling the configurations to/ from user memory files, and some status displays.

2. **The ADX-2400 Channel Setup**

   This is where 'truck-end' routing assignments are made for the talkback outputs, IFB and Program paths, and PL ports. These assignments are made using the OUTPUT SELECT and SOURCE buttons on the ADX-2400. The LEVEL button also is available to control output levels to both the rear-panel outputs and the outputs sent to the network and thus to the remote devices. The DELAY function is not available in announce booth mode.

3. **The Remote Device menus**

   Each remote device (ADX-120/140) has an internal menu which may be accessed remotely via the ADX-2400.

   These menus configure the hardware of the remote device itself, and are specific to the particular model, i.e. the ADX-120 has different options from the ADX-140 because of differences in their hardware capabilities.

   These menus configure such things as preamp gain, phantom power, IFB output configurations, headset impedence (level), button color, etc.

   These remote menu settings are saved in the remote devices themselves, and will remain associated with a particular device, even if it is moved or has its system ID reassigned. These settings are not stored in the ADX-2400 at the truck.

   Status of many of the remote configuration items is displayed by LEDs on the remote devices (rear panel on the ADX-120s, front panel on the ADX-140s).

Setting System ID Switches

The System ID switches on each unit allow the system to distinguish one unit from another. Cobranet bundle numbers and Ethernet IP addresses are automatically determined based on the System ID Switches.

The System ID switches are two-digit rotary switches on the rear panel of the ADX-120 and on the front panel of the ADX-140. The ADX-2400 also has System ID switches, which are behind the removeable front panel, on the PCB sub-panel.

The range for the switches is from 01 through 99 (00 is not a valid ID). No two devices may have the same ID number.

The System ID settings for the ADX-120/140 units become the reference for the physical unit, and will be used in assigning those units to be A, B, C, and D designations in the ADX-2400 menus (see below).

Assigning the ADX120 / ADX140 to be Units A, B, C, or D

The announce units must first be assigned to be devices A, B, C, or D in the ADX2400 menu. To do this, press the **MENU** button once, and select config items 1, 2, 3, and 4 respectively using the knob. When the desired item is selected, press the **MENU SET** button and select the appropriate System ID number for the ADX120 or ADX140 you want to assign. Pressing either SET or MENU will take you back to the item select mode.

Accessing Remote Menus from the ADX-2400

The configuration items for the ADX-120 and ADX-140 units are accessable from the front panel of the ADX-2400. To access these remote unit menus, double-click the **MENU** button on the ADX2400. The display will say: SELECT REMOTE DEVICE. The **MENU** button will be flashing to indicate that a remote device is being accessed.

The menu display will look similar to this:

The number in the brackets is the System ID assigned in the ADX-2400 for Unit A (in this example). If the selected device is present on the network, it's model number and System ID number will be displayed (ADX120-01 in this example).

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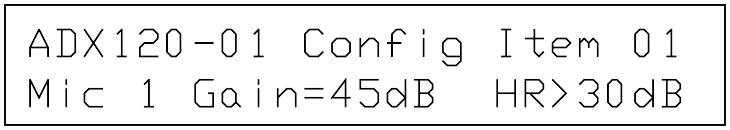
Scroll to the desired assigned device (either A, B, C or D).

Press **MENU** again. This will access the menu of the remote device, and the menu might look like this (depending on the type of device and the selected item):



The configuration and status items may be selected using the knob. Once the desired item is selected, press the **MENU SET** button to allow changing that item's settings. Settings are saved automatically after about 10 seconds of inactivity.

Press either **MENU SET** or **MENU** to go back to the item select mode.

When you're done, the easiest way out of any of the menu modes is to just press the **OUTPUT SELECT** button. This will cancel all menu modes, and you won't have to step backwards out of them.

ADX-120 Remote Menu Items

The ADX-120 menu items for firmware version 1.0 are listed below. These items may be accessed from the ADX-2400 front panel, or via the RS-232 remote port on the ADX-120 rear panel.

- **Config Item 01 – Mic 1 Gain (25-70dB)**

This is the preamp gain for microphone input 1 (the front-panel headset input). It would typically run around 40 or 45 dB for normal sports use. A headroom indication is also provided in the lower right corner of the display (HR=XXdB). This headroom is calculated from the peak audio levels, and has about a one-second update rate. It is accurate, and will give a good indication of headroom before either preamp or A-to-D clipping.

- **Config Item 02 – Mic 2 Gain (25-70dB)**

Same as above for microphone input 2 (rear-panel XLR). When this input is in the 'Line In' mode, the gain is fixed, and Item 02 will indicate that the input is in line mode.

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Remote Menu Items - continued

- **Config Item 03 – Channel 2 Input (Mic or Line)**

This selects either mic or line input mode for the rear-panel XLR input. When in Mic mode, Item 02 sets preamp gain. When in Line mode, the gain is fixed through at unity through the system. The nominal 0VU level is +4dBm. Output level at the truck is still adjustable on the ADX-2400. Line input mode is indicated by a yellow LED on the rear panel.

- **Config Item 04 – Mic 1 Phantom (On / Off)**

Turns on phantom power for Mic 1. Indicated by a green LED on the rear panel.

- **Config Item 05 – Mic 2 Phantom (On / Off)**

Turns on phantom power for Mic 2. Indicated by a green LED on the rear panel. Phantom power for Mic 2 will automatically be turned off when Line In mode is selected.

- **Config Item 06 – IFB 1 Mode**

Controls the signal routing for the IFB 1 output (front-panel headset). The selections are as follows:

Normal 2 Ch - IFB1 is routed to one side , PGM1 is routed to the other side
IFB to Both - IFB1 is routed to both sides of stereo headphones
PGM to Both - PGM1 is routed to both sides of stereo headphones
MIX to Both - IFB1 and PGM1 are mixed and routed to both sides. Volume knobs control the mix.
IFB to Mono - IFB1 is routed to the tip only of the 1/4" TRS jack
PGM to Mono - PGM1 is routed to the tip only
MIX to Mono - (see above)

Note: if you're using a mono headphone with a tip-sleeve plug select one of the mono modes to avoid signal current from the other amplifier being shorted into ground.

- **Config Item 07 – IFB 2 Mode**

Configures the IFB 2 (rear-panel XLR) output. The selections are as follows:

Wet 2 Ch - Configured as 2-ch RTS-format. IFB2 on Ch1, PGM2 on Ch2.
Dry - IFB - Configured as dry balanced +4 output of IFB 2.
Dry - PGM - Configured as dry balanced +4 output of PGM 2.
Dry - Mic 1 - Configured as dry balanced +4 output of Mic 1 (headset Mic)*

Remote Menu Items - continued

- **Config Item 08 – Hdst Volume (Normal, High)**

This controls the range of the signals feeding the headphones (front-panel jack). It is really an adjustment for headphone impedence; e.g., it matches the range of the volume control knobs to the impedence of the headphones. Normal should be used unless high-impedence headphones cause the volume to be inadequate. The High setting provides a 10dB increase in signal level.

- **Config Item 09 – Mute Off Clr**

This sets the color of the illumination for the Mute button when it's in the off state (not depressed).

- **Config Item 10 – Mute On Clr**

This sets the color of the illumination for the Mute button when it's in the on state. (depressed)

Config Item 11 –TB 1 Off Clr
Config Item 12 –TB 1 On Clr
Config Item 13 –TB 2 Off Clr
Config Item 14 –TB 2 On Clr

Illumination colors for on and off states of the Talkback buttons (as above).

- **Config Item 15 – Button Mode (Momentary / Mute / TB / All)**

Modes of Mute and Talkback buttons. Latching is 'smart' latching - tap to latch.

- **Config Item 16 – GPI Inputs (Disabled / Enabled)**

Enables operation of the three GPI inputs on the rear panel (D9 connector). The inputs are available for hand-held or footswitches, and operate the Mute, Talkback 1 and Talkback 2 functions respectively.

The remaining menu items are status items

- **Status Item 01 – PCB Temperature**

This item displays internal temperature of the ADX-120 in degrees Centigrade. Nominal temperature is in the 35 - 45 degree range, depending on ambient and PL and IFB loading. Temperatures above 60 degrees are cause for concern and operating conditions should be investigated.

- **Status Item 02 – PL Current**

DC Current drawn by the external PL beltpacks. This should be less than 100 milliamps. The PL power supply will go into a shutdown condition if current is greater than 140 ma.

Remote Menu Items - continued

- **Status Item 03 – PL Voltage**

DC Voltage of PL power supply. Nominally 25 volts.

- **Status Item 04 – IFB Current**

DC Current drawn by the external IFB beltpacks. This should be less than 100 milliamps. The IFB power supply will go into a shutdown condition if current is greater than 140 ma.

- **Status Item 05 – IFB Voltage**

DC Voltage of IFB power supply. Nominally 25 volts. Note that if a dry mode is selected for IFB2, the power supply will be turned off and voltage will read zero.

- **Status Item 06 - Active E-net Port (Pri / Sec)**

Indicates which of the two Ethernet ports on the ADX-120 is active, Primary or Secondary. If there is a '*' next to the Sec display, this indicates that the primary port has a link and data, and the ADX-120 has tried to use the primary port twice and didn't find audio. The astrisk means it has given up, and will stay on the secondary port until reset.

- **Status Item 07 - Pri Port Status (No Link / Link Only / Link+Data)**

Indicates the current status of the primary Ethernet port. No Link indicates that there is no Ethernet link to the switch. Link Only means that there is a link to the switch but no packets are being received. Link+Data means that packets are being received which usually indicates Cobranet traffic, but not necessarily audio for this unit (if perhaps it were not assigned at the truck).

- **Status Item 08 – Sec Port Status (No Link / Link Only / Link+Data)**

Same as above for the secondary port.

- **Status Item 09 – Firmware Version**

Display of the version number of the firmware installed in the ADX-120.

Resetting the ADX-120 Menu Variables to a Standard Configuration

The menu variables in the ADX-120 may be reset to a known standard configuration by holding down any of the front-panel buttons for five seconds when powering up the unit. (Hold one of the buttons down and apply power. After the unit initializes the menus will be reset).

The standard configuration is:

Both Phantoms Off
Both Preamp Gains = 45dB
Channel 2 set for Mic Input
IFB1 set to Normal 2 Channel mode
IFB2 set to Dry IFB mode
Headset Volume set to Normal
Mute Color = Green
TB1 Color = Red
TB2 Color = Cyan
Button Mode = Momentary
GPIs Disabled

Accessing the ADX-120 Menu Via the Remote Connector

The ADX-120 menus are also accessable via the RS-232 port in the Remote Control connector on the rear panel. Although it's unlikely that you would need this function it allows configuration of the unit in a case where it might be operated with Cobranet hardware other than the ADX-2400. We also use it for test purposes in the shop.

The connector has a standard old-fashioned PC modem pinout, and will connect directly to a PC comm port or a USB-Serial adapter. The PC will need to run a generic terminal application (like Hyperlink, or one of the many shareware terminal apps available).

The baud rate is 38.4K, no parity, one stop bit. When the PC is connected, press return, and you'll see the the ADX-120 menus. The space bar will toggle between item select mode and variable set mode. The comma and period keys ('<' and '>') take the place of the knob to step through the items or to change the settings.

Setting up Truck End Routing in the ADX-2400 (Channel Setup)

The ADX-2400 at the truck has routers which select the following:

- **Talkback** paths from the announce boxes to physical Talkback outputs. Mixes may also be selected so that external talkback mixing is not required.

- Physical **IFB inputs** at the truck to the various IFB outputs on the ADX-120/140 units. One physical input may feed multiple IFB outputs.

- Physical **PGM inputs** at the truck to the various PGM outputs on the ADX-120/140 units. One physical input may feed multiple PGM outputs.

- Four-wire **PL Ports** to the various PL channels on the ADX-120/140 units. Any PL channel on the ADX-120/140s may be assigned to any four-wire port. The appropriate mix-minus signals will automatically be generated, similar to the 'party-line' function in the Adam intercom systesm.

These selections are made by the 'Channel Setup' buttons on the front panel of the ADX-2400.

There 48 outputs which may be selected by the OUTPUT SELECT button and knob.

The first 24 are the rear panel outputs. These are referred to as 'Local' outputs 1-24. 1-8 are the Microphone outputs, 9-16 are the Talkback outputs, and 17-24 are the output side of the four-wire PL ports.

The second 24 outputs are the 'Net' outputs. These are the signals which are fed to the Ethernet network, and on the the ADX-120/140 units. Net outputs 1-8 are the IFBs, 9-16 are the PGM feeds, and 17-24 are the listen side of the PL channels.

When the OUTPUT SELECT button is lit, the knob will scroll through the 48 possible outputs. Additional presses of the OUTPUT SELECT button will step to the beginning of the next group of eight.

When a particular output is selected, press the SOURCE button to view or change the routing for that output.

Some outputs, such as the microphones, are not routable and have no selection options. Other outputs, such as the talkbacks, have many choices. The menu choices should be self-explanatory.

Note that the LEVEL button may also be used to adjust the level of a given output to a value other than unity (0.00dB). We suggest that this only be used when necessary for some non-standard condition, and that unity should be the correct setting in most cases.

Reliability Considerations

Since the commentary microphones and communications are typically provided by this system, reliability is of primary concern. The ADX-series products are designed with highest-quality components and conservative ratings so as to be as reliable as possible.

In addition, after manufacture, the ADX products undergo an extensive burn-in process which includes power and thermal cycling to attempt to precipitate out any early-life failures.

Even with these precautions failures are not impossible, and in addition there are other components to the system such as Ethernet switches which must also be considered in evaluating the overall reliability question.

Here are some thoughts on insuring a reliable on-air system:

- Provide a spare announce box and headset. This practice has been going on for decades with analog systems, and it's still a good idea. It protects against failure of the ADX-120 and the headset.

- Use the ADX-8000 to provide power for the ADX-120s. This unit contains redundant power supplies and will provide highly-reliable power, even in the event of the failure of one of the supplies.

- Insure a reliable AC power source in the remote location for the ADX units and for the Ethernet switch. If there is any question about the reliability of the AC supply you might consider using a small UPS power supply to provide battery backup. A small 500 watt unit intended for personal computer use will provide an hour or more of operation in the event of power failure.

- Use reliable Ethernet hardware such as switches, fiber SFPs, etc. Burn in new switches for a few days before putting them on the air. Keep all Ethernet cables and fiber in good condition.

- Many switches have two or more fiber ports available. Using managed switches or the ADX-8000 allows using redundant ports with 'trunking' or 'port aggregation' enabled to allow multiple fibers to be utilized for redundancy.

- In extremely critical applications duplicate switches may be used in order to establish a complete parallel network. Contact Lance Design for more information on this type of operation.

ADX-120 Specifications

Microphone Inputs	2 low-impedence balanced. Phantom power available
Preamp Gain (total path)	+25dB to +70dB
Freq Response	20-20KHz, +/- 0.5 dB
Microphone Channel EIN	125 dB, bandwidth-limited to 25KHz
System Signal/Noise	>100 dB below peak level, bandwidth-limited to 25KHz
Distortion	<0.05% for Mic/Line and Dry IFB. <0.1% for PL / Wet IFB
Microphone Preamps	THAT Corporation 1570 / 5171
A-D and D-A Conversion	24-bit
Digital Processing	Dual-core 32-bit dsp
Cobranet Transmission	20-bit uncompressed
Sample Frequency	48 kHz
Path Latency	Approx 2.25 Milliseconds on all paths (analog to analog)
IFB 1 Outputs	2 channel dry unbalanced. Max power in 600 ohms is 120mw.
IFB 2 Outputs	2 channel wet RTS-format or single-channel dry +4dB nom.
PL Interface (Booth End)	2 channel wet RTS-format. DC current to support 2 beltpacks
PL Interface (Truck End)	4-wire dry +4dBm nominal. 8 assignable 4W Ports
PL Trans-hybrid Loss	Greater than 55 dB
Remote Control	From ADX-2400, From rear-panel RS232, or GPI
Front Panel Switches	Three; Mute, Talkback 1, Talkback 2. RGB Illumination
System Addressing	Rear panel two-digit rotary switches. Address 01-99
Bundle Numbers	Set automatically based on System Address
Power Requirements	48 Volts DC, 195 ma. 320 ma with four RTS/Telex beltpacks.
Power Source	48V on spare Cat5 pairs
Ethernet Interface	100baseT Standard Ethernet (redundant RJ45 ports)
Ethernet Bandwidth Req'd	Approximately 8 megabits each direction per ADX-120
Dimensions	9" wide x 5.5" deep x 2.5" high Weight approx. 2.5 pounds

The ADX-2400 Physical Rear Panel Outputs:

Out 1	Mic A1 Out	(ADX120 Hdst Mic; ADX140 Input 1)
Out 2	Mic A2 Out	(ADX120 Rear Panel; ADX140 Input 2)
Out 3	Mic B1 Out	
Out 4	Mic B2 Out	
Out 5	Mic C1 Out	
Out 6	Mic C2 Out	
Out 7	Mic D1 Out	
Out 8	Mic D2 Out	

Out 9	Talkback Output 1	(Each physical Talkback output may be fed
Out 10	Talkback Output 2	by any of the Talkback paths from the ADX-
Out 11	Talkback Output 3	120s, or various mixes)
Out 12	Talkback Output 4	
Out 13	Talkback Output 5	
Out 14	Talkback Output 6	
Out 15	Talkback Output 7	
Out 16	Talkback Output 8	

Out 17	4-Wire PL Port 1 Out	(Each PL channel at the ADX-120/140s
Out 18	4-Wire PL Port 2 Out	may be assigned to any of the 4-wire
Out 19	4-Wire PL Port 3 Out	ports.)
Out 20	4-Wire PL Port 4 Out	
Out 21	4-Wire PL Port 5 Out	
Out 22	4-Wire PL Port 6 Out	
Out 23	4-Wire PL Port 7 Out	
Out 24	4-Wire PL Port 8 Out	

The ADX-2400 Physical Rear Panel Inputs:

Input 1	IFB In 1	(Each IFB output at the ADX120s may be fed
Input 2	IFB In 2	from any if the eight physical IFB inputs)
Input 3	IFB In 3	
Input 4	IFB In 4	
Input 5	IFB In 5	
Input 6	IFB In 6	
Input 7	IFB In 7	
Input 8	IFB In 8	

Input 9	PGM In 1	(Each PGM output at the ADX120s may be fed
Input 10	PGM In 2	from any of the eight physical PGM inputs)
Input 11	PGM In 3	
Input 12	PGM In 4	
Input 13	PGM In 5	
Input 14	PGM In 6	
Input 15	PGM In 7	
Input 16	PGM In 8	

Input 17	4-Wire PL Port 1 In	(Input side of 4W PL Interface. See above)
Input 18	4-Wire PL Port 2 In	
Input 19	4-Wire PL Port 3 In	
Input 20	4-Wire PL Port 4 In	
Input 21	4-Wire PL Port 5 In	
Input 22	4-Wire PL Port 6 In	
Input 23	4-Wire PL Port 7 In	
Input 24	4-Wire PL Port 8 In	

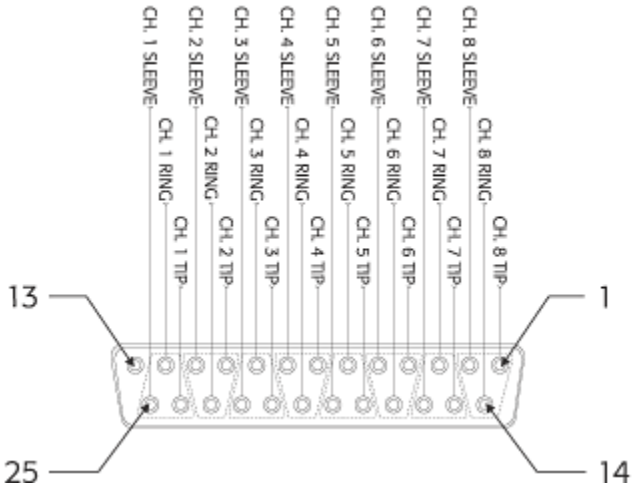
Lance Design ADX-2400N Analog Pinout (Inputs and Outputs)

Audio Channel	D-25 Pin
CH 1 +	**24**
CH 1 -	**12**
CH 1 SHLD	**25**
CH 2 +	**10**
CH 2 -	**23**
CH 2 SHLD	**11**
CH 3 +	**21**
CH 3 -	**9**
CH 3 SHLD	**22**
CH 4 +	**7**
CH 4 -	**20**
CH 4 SHLD	**8**
CH 5 +	**18**
CH 5 -	**6**
CH 5 SHLD	**19**
CH 6 +	**4**
CH 6 -	**17**
CH 6 SHLD	**5**
CH 7 +	**15**
CH 7 -	**3**
CH 7 SHLD	**16**
CH 8 +	**1**
CH 8 -	**14**
CH 8 SHLD	**2**

Audio Channel	D-25 Pin
CH 9 +	**24**
CH 9 -	**12**
CH 9 SHLD	**25**
CH 10 +	**10**
CH 10 -	**23**
CH 10 SHLD	**11**
CH 11 +	**21**
CH 11 -	**9**
CH 11 SHLD	**22**
CH 12 +	**7**
CH 12 -	**20**
CH 12 SHLD	**8**
CH 13 +	**18**
CH 13 -	**6**
CH 13 SHLD	**19**
CH 14 +	**4**
CH 14 -	**17**
CH 14 SHLD	**5**
CH 15 +	**15**
CH 15 -	**3**
CH 15 SHLD	**16**
CH 16 +	**1**
CH 16 -	**14**
CH 16 SHLD	**2**

Audio Channel	D-25 Pin
CH 17 +	**24**
CH 17 -	**12**
CH 17 SHLD	**25**
CH 18 +	**10**
CH 18 -	**23**
CH 18 SHLD	**11**
CH 19 +	**21**
CH 19 -	**9**
CH 19 SHLD	**22**
CH 20 +	**7**
CH 20 -	**20**
CH 20 SHLD	**8**
CH 21 +	**18**
CH 21 -	**6**
CH 21 SHLD	**19**
CH 22 +	**4**
CH 22 -	**17**
CH 22 SHLD	**5**
CH 23 +	**15**
CH 23 -	**3**
CH 23 SHLD	**16**
CH 24 +	**1**
CH 24 -	**14**
CH 24 SHLD	**2**

6 FEMALE CONNECTORS ON CHASSIS [INPUT AND OUTPUTS]



Remote / GPI Connector Pinout

Pin #	Function
1	Ground
2	RS232 Data Out (TX)
3	RS232 Data In (RX)
4	(no connection)
5	Ground
6	GPI 1 In (Mute)
7	GPI 2 In (Talkback 1)
8	GPI 3 In (Talkback 2)
9	Ground

GPI inputs are TTL-compatible inputs, pulled up to +5 volts with a 5K resistor. They should be pulled to ground with a dry switch closure to activate.

RS232 Remote port is 38.4K Baud, One Stop Bit, No Parity

NOTES: