

LP4

AUTOMATIC MIXER PREAMP MODULE

OPERATING INSTRUCTIONS and trouble-shooting guide

LECTROSONICS, INC.

Rio Rancho, NM

INTRODUCTION

The LP4 Automatic Mic Preamp Module provides balanced, low-noise pre-amplification of signals from microphone to line levels. In addition, the LP4 (in combination with an AC1 Automatic Main Module) implements all necessary functions to perform fully automatic mixing. The LP4 has 3 modes of operation; automatic, priority, and direct. These modes are switch selectable from the front panel.

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GENERAL TECHNICAL DESCRIPTION

The microphone preamp of the LP4 uses a fully discrete design for low equivalent input noise and low distortion. Three preamp gain choices provide a convenient means for accommodating dynamic, electret, or line level sources.

The LP4 uses 2:1 expansion rather than abrupt gating to attenuate the channels which have no activity. Maximum attenuation is 15dB. The use of 2:1 expansion results in the total absence of “signal chopping” or other anomalies often associated with automatic mixers that gate. The detection circuitry associated with the expansion function is filtered specifically to respond to energy in the voice range, rejecting both low and high frequency signals. An RMS detector is used to determine channel signal level accurately.

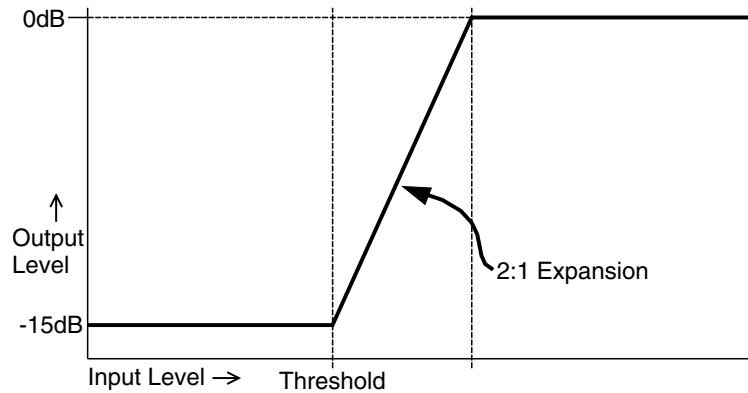


Figure 1 - LP4 Expansion Action

When a signal is presented to an inactive channel, it is compared to the current threshold voltage value. The threshold value consists of the sum of the Automatic Ambient Sensing (AAS) signal, the front panel Threshold value, and a Variable Threshold component. The AAS system tracks the ambient level at each microphone to establish an adaptive minimum turn on threshold. The front panel fixed Threshold control allows an offset from the AAS minimum to be added. The Variable Threshold consists of a signal proportional to the highest instantaneous channel level. Microphone channel gain begins to increase when the microphone channel level exceeds the threshold. As the signal in the channel increases in level, channel gain also increases. When the channel signal level is 15dB above threshold, the channel is at unity gain and no more gain increase happens.

Indicators, in the form of LEDs, are provided to indicate the operational status of each channel. A green Channel On LED indicates channel activity (defined as channel gain no less than 8dB below unity), allowing simple adjustment of the Threshold control (on the AC1 Automatic Controller Module).

An optically coupled Logic output is provided on a rear panel terminal strip to indicate when a channel is open. The output may be wired active high or active low, depending on the application. See Appendix 1 for logic output wiring details.

Two line level Sends (which are individually jumperable pre- or post-attenuator) are also provided on the rear panel terminal strip to facilitate recording of individual channels. 48 volt phantom power is supplied to each channel, and can be selected on a channel by channel basis.

The LP4 has the capability for the level of each channel to be remotely controlled by a potentiometer or switch. In addition, the maximum level of remote attenuation may be selected via a jumper to be 10dB or 70dB.

Other jumperable options include NOM Send In/Out (which allows the channel to operate without affecting the NOM count), as well as a Max Mics function (which allows the system to be set for one mic on only or no limit to the number of on mics). In addition, the signal sent to the Main and Auxiliary internal buses is jumperable pre- or post-attenuator for both buses.

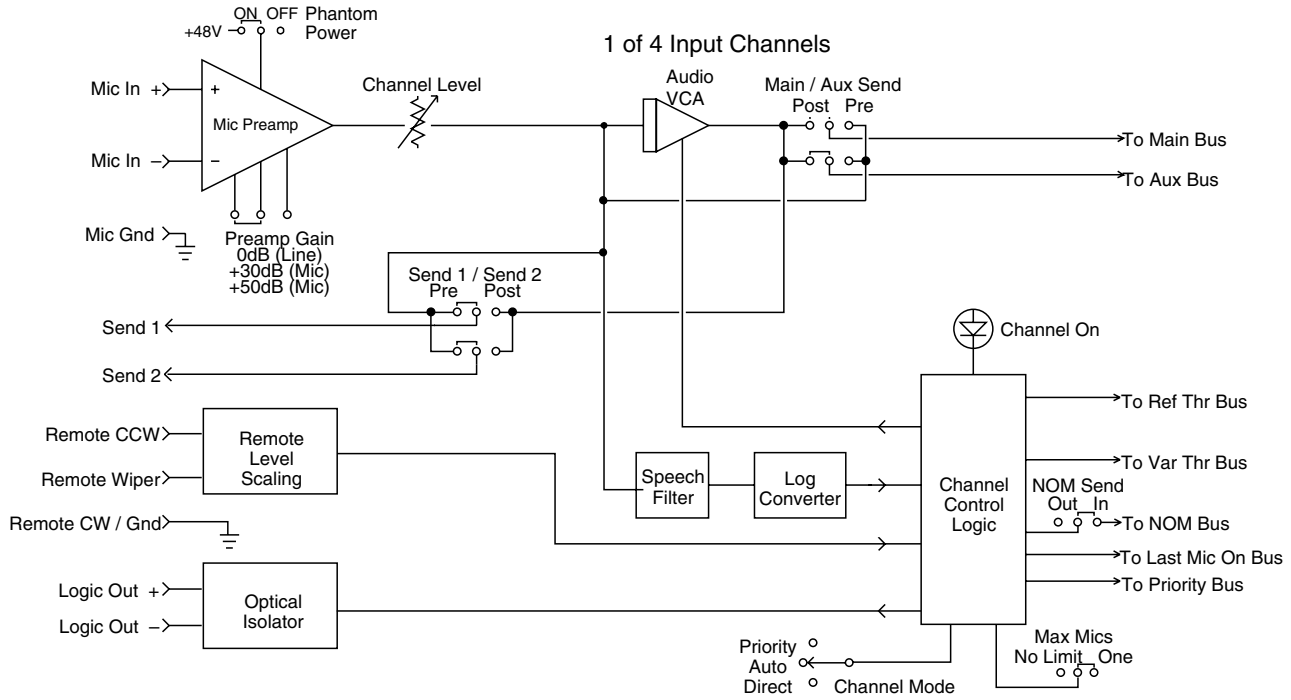


Figure 2 - LP4 Block Diagram

INSTALLATION

Before installing the module, see the Operating Instructions section for guidance as to how to select the various jumperable options on the LP4.

The LP4 is installed from the rear of the Modular Audio Processor mainframe. While the LP4 can slide into any of the ten Modular Audio Processor slots, it is recommended that the LP4 modules be loaded from left to right (facing the front of the mainframe). This will both facilitate microphone cabling to the mic inputs and eliminate unwieldy cable runs from the Main or Aux outputs of the control module. This approach is particularly useful if other Modular Audio Processor system signal processing modules (EQN1, DP1, LE8, etc.) are being used.

Care should be taken when aligning the circuit board with the card guides. Once the module is aligned, slide the card forward in the mainframe until the female edge connector on the module seats firmly onto the male pins of the main bus board. Again, care should be taken to insure proper mating of the connectors.

Four #4 machine screws are provided with the LP4 module. The two screws with captive washers are used to secure the rear panel to the top and bottom rails of the mainframe. After this is accomplished, fit the front panel (also supplied) over the front of the module and secure it, using the two flat-head #4 machine screws, to the front panel of the Modular Audio Processor mainframe. Once these four screws are in place, the installation is complete.

FRONT PANEL DESCRIPTION

CHAN LEVEL - Controls the level of signal from the channel that feed all buses. This control is before the level sensing and attenuation circuitry, so it will also affect the relative channel sensitivity of the automatic action. Maximum gain occurs when this control is fully clockwise.

CHAN ON LED - Indicates gain of the channel. The LED illuminates when the channel gain is approximately 8dB below unity. The Threshold control (on the Automatic Control Module) should be adjusted until there is no illumination of the "CH ON" LED because of background noise.

MODE - Selects the operational mode of the channel.

Priority Mode: Activity on priority channels fully attenuates non-priority channels. There is no limit to the number of priority channels for a system. Activity on priority microphones will not effect channels in the Direct Mode.

Auto Mode: Channel functions as an automatic channel.

Direct Mode: Channel functions as a standard channel. In this mode, the "CH ON" LED will be on continuously to indicate no channel attenuation under any circumstance.

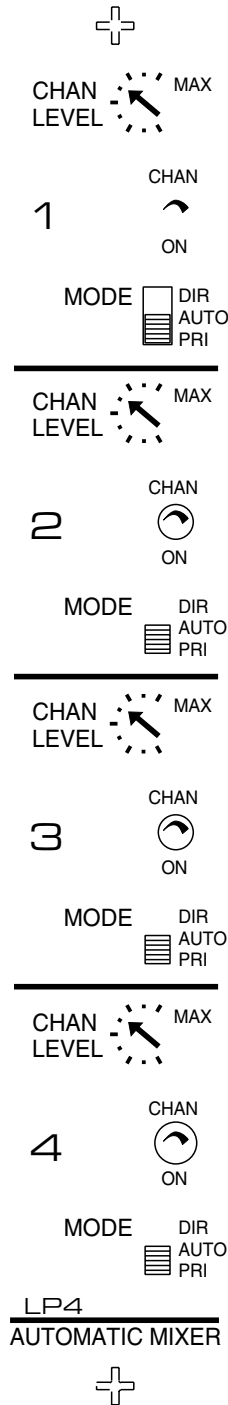


Figure 3 - LP4 Front Panel

REAR PANEL DESCRIPTION

MIC INPUT - Accepts balanced or unbalanced signal. Can accommodate signal levels from mic to line. Fully balanced differential input, RF filtered, internally selectable 48 volt phantom supply. Terminal connector position 1 is "+", 2 is "-", and 3 is ground.

SENDS 1/2 - Output the preamplified, pre- or post-attenuator, channel level signal. For use if recording or other action is desired on a per channel basis. This output is unbalanced. Terminal connector positions for the Send outputs are: Send 1 - 4, Send 2 - 5.

GND/CW - Provides a ground connection for signal processing equipment used with the Send outputs, as well as the CW connection for the Remote Level control. Position 8 on the terminal strip.

REMOTE LEVEL - Provides the capability to control the channel level from a remote location using a 10K linear taper pot, switch, or control voltage. Position 6 is the counterclockwise pot connection, position 7 is the wiper connection, and the clockwise connection is pin 8.

LOGIC OUTPUT - Provides a logic signal that corresponds to channel "ON" status. Will actuate if the channel is on for any reason, including selection of "Direct" mode. The output is an optically isolated NPN transistor. The "+" output (position 9 on the terminal strip) is connected to the collector of the transistor. The "-" output (position 10 on the terminal strip) is connected to the emitter of the transistor. The device is compatible with normal 5 Volt power, and has a maximum breakdown voltage of 30 Volts. The output can be wired as active high or active low (see appendix 1 for details).

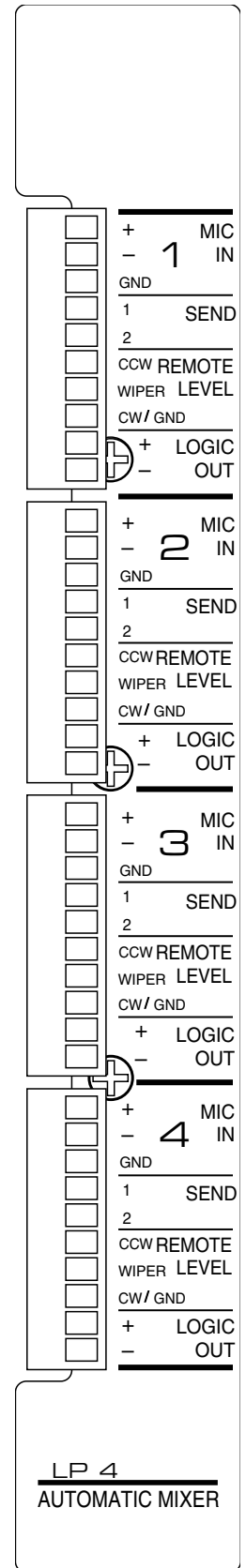
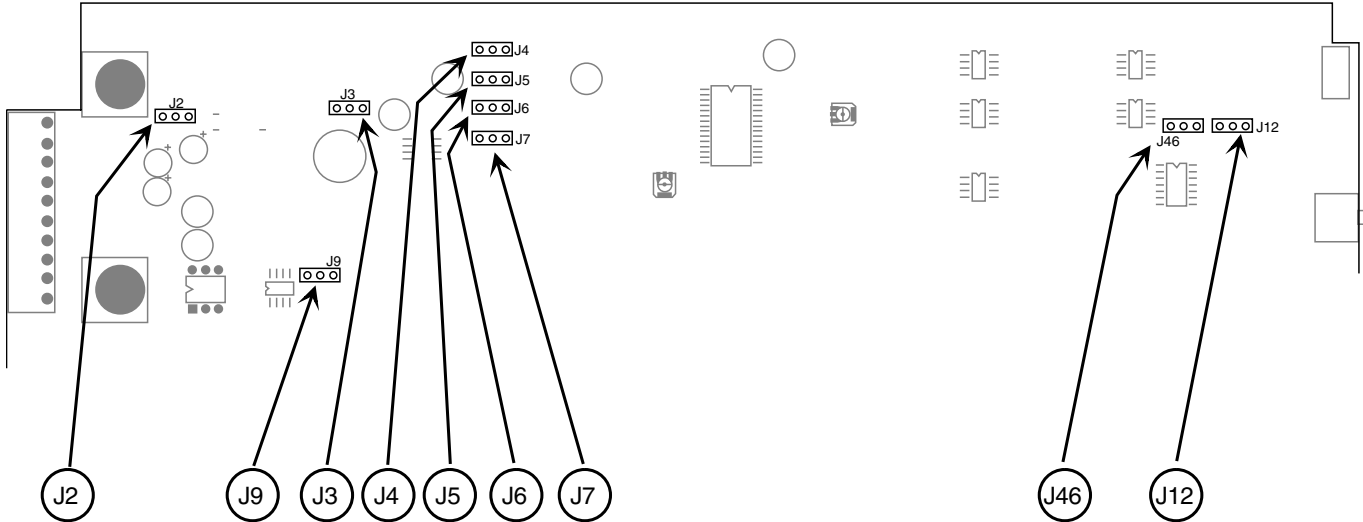


Figure 4 - LP4 Rear Panel

OPERATING INSTRUCTIONS

The following instructions assume the presence of an Automatic Control Module.

1) Select the proper jumper settings for the application. Figure 5 shows the factory settings of all the jumperable options, along with the jumper positions for each option. A short description of each jumperable option follows:












Factory Jumper Presets					
Function	Jumpers	Preset	Function	Jumpers	Preset
Phantom Power	CH1- J2	 OFF ON	Main Pre/Post VCA	CH1- J4	 PRE POST
	CH2- J14			CH2- J17	
	CH3- J29			CH3- J27	
	CH4- J36			CH4- J38	
Preamp Gain	CH1- J3	 0 50 30	Aux Pre/Post VCA	CH1- J5	 PRE POST
	CH2- J16			CH2- J18	
	CH3- J26			CH3- J28	
	CH4- J37			CH4- J39	
Attenuation Limit	CH1- J9	 10dB 70dB	MaxMics	CH1- J12	 OUT IN
	CH2- J21			CH2- J24	
	CH3- J31			CH3- J34	
	CH4- J42			CH4- J45	
Send 1 Pre/PostVCA	CH1- J6	 PRE POST	NOM Send	CH1- J46	 No Limit One
	CH2- J19			CH2- J47	
	CH3- J29			CH3- J48	
	CH4- J40			CH4- J49	
Send 1 Pre/Post VCA	CH1- J7	 PRE POST	Max Mics		
	CH2- J20				
	CH3- J30				
	CH4- J41				

Figure 5 - LP4 Jumpers

Phantom Power - +48V phantom power is provided to the “+” and “-” microphone input terminals. A maximum of 4mA per terminal is available. Factory default is phantom power off.

Preamp Gain - Chooses one of the three preamp gain options: 0dB for line level sources, 30dB for electret microphones, and 50dB for dynamic microphones.

Attenuation Limit - Allows the selection of the maximum channel attenuation when using the remote level function. Attenuation level limits of 10dB and 70dB are available. Factory default is 70dB.

Send 1/2 Pre/Post - The channel signal sent to the Send output can be jumpered pre- or post-attenuator. The factory default is pre-attenuator.

Main Pre/Post - The channel signal sent to the Main bus can be jumpered pre- or post-attenuator. The factory default is post-attenuator (i.e. normal automatic action)

Aux Pre/Post - The channel signal sent to the Aux bus can be jumpered pre- or post-attenuator. The factory default is post-attenuator.

NOM Send - This option prevents the channel from contributing to the NOM count when in the out position. Factory default is in.

Max Mics - This option allows a limit of one active microphone to be imposed on the system. The “No Limit” position, which allows for more than one microphone to be active, is the normal operating mode and the factory default setting for the LP4. Note that all preamp channels in the system must be set up identically, either one mic or no limit.

Proper setup of the microphone preamp channel levels is important to achieve consistent turn-on performance from each microphone. The Channel Level controls on the LP4 control both volume and turn-on sensitivity. Therefore, if the Channel Level controls are adjusted such that all channels achieve about the same loudness level (with average talkers speaking at the expected working distance from the system microphones), the turn-on sensitivity will for all microphones will be approximately equal.

2) Start with the Threshold Level on the AC1 at about 1/4 of full rotation, and all LP4 Channel Level controls at fully counterclockwise, and the Last Mic switch on the AC1 in the “On” position.

3) Move the Channel Level control of the first channel to be set up to mid position. Adjust the AC1 Main Level control for comfortable volume in the room.

4) With an average talker speaking at the expected working distance from each system microphone in turn, adjust the associated LP4 Channel Level control for adequate level from each microphone.

5) The Threshold Level on the AC1 should be adjusted as necessary for the particular ambient situation.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE
1) No sound from system	1) Main level control not turned up 2) Channel level not turned up
2) Sound “pumps” and is unnatural	1) Threshold on Automatic Control Module is too high. (Make sure “CH ON” LED glows consistently during normal speech.) 2) Last Mic Hold (on AC1 module) should be ON.

REMOTE LEVEL CONNECTIONS

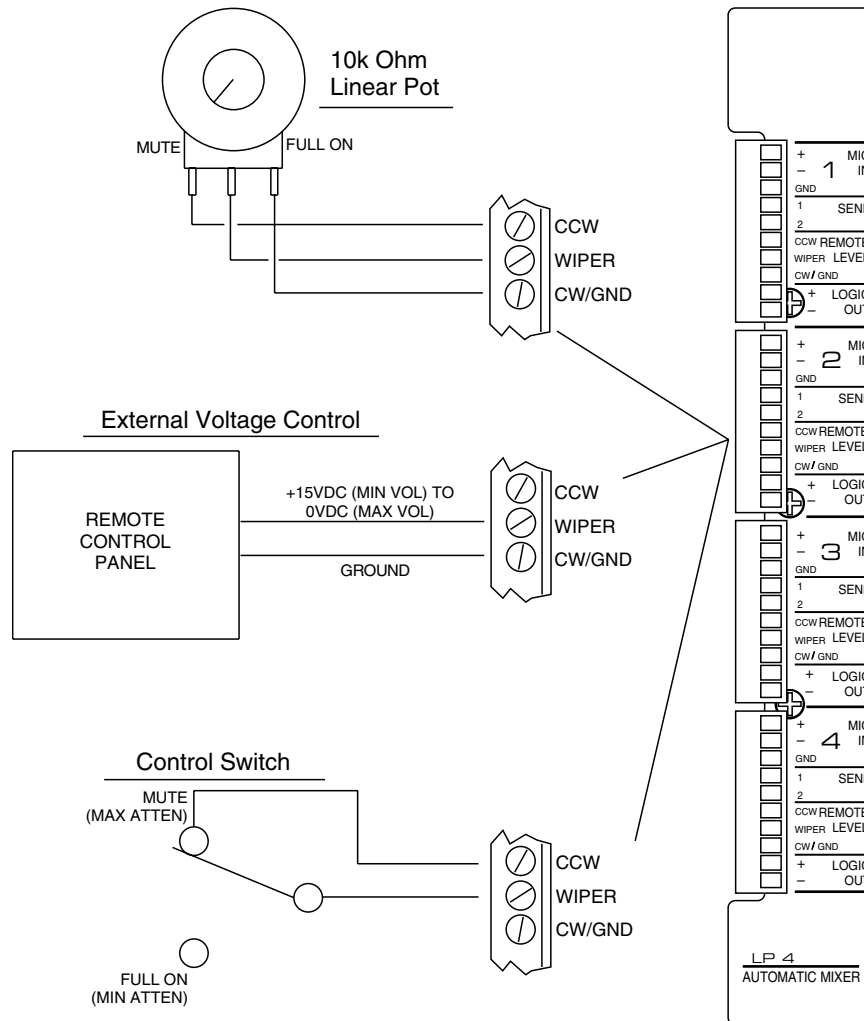


Figure 6 - LP4 Remote Level Connections

SERVICE AND REPAIR

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check out the inter-connecting cords and then go through the TROUBLE SHOOTING section in the manual

We strongly recommend that you do not try to repair the equipment yourself and do not have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. There are no adjustments inside that will make a malfunctioning unit start working.

LECTROSONICS service department is equipped and staffed to quickly repair your equipment. In-warranty repairs are made at no charge in accordance with the terms of the warranty. Out of warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out of warranty repairs.

RETURNING UNITS FOR REPAIR

You will save yourself time and trouble if you will follow the steps below:

- A. DO NOT return equipment to the factory for repair without first contacting us by letter or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 am to 4 pm (Mountain Standard Time).
- B. After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the outside of the shipping container.
- C. Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.
- D. We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Mailing address:

Lectrosonics, Inc.
PO Box 15900 581 Laser Rd.
Rio Rancho, NM 87174
USA

Shipping address:

Lectrosonics, Inc.
(800) 821-1121
Rio Rancho, NM 87124
USA

Telephones:

(505) 892-4501
FAX: (505) 892-6243

World Wide Web: <http://www.lectrosonics.com>

email: sales@lectrosonics.com

SPECIFICATIONS

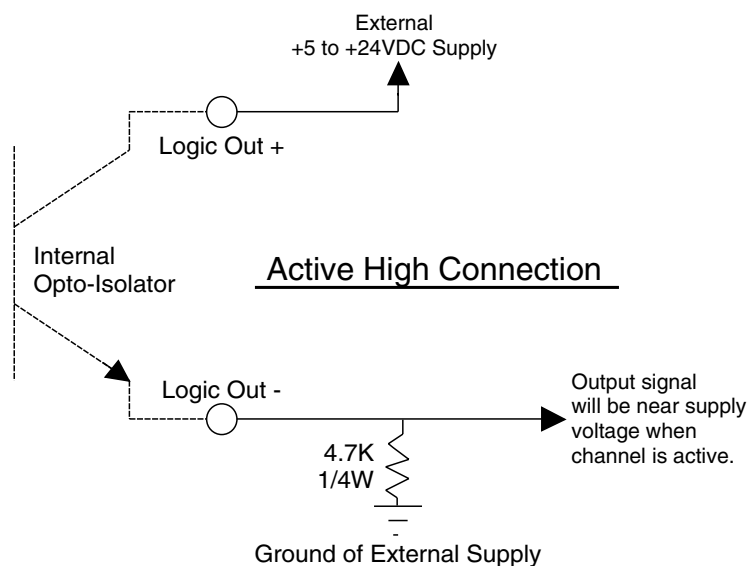
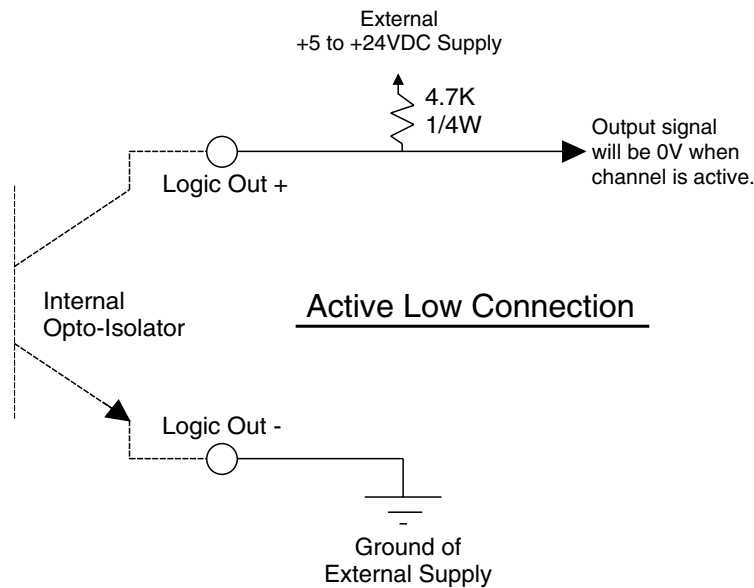
Preamp Gain Options:	0dB, 30dB, and 50dB
Maximum Channel Attenuation:	15dB
Equivalent Input Noise, 20-20kHz:	-127dBu, at 50dB gain
THD, 20-20KHz:	Less than 0.05% (any gain, 0dBu out)
IMD, 60/7kHz:	Less than 0.05% (any gain, 0dBu out)
Input Impedance:	greater than 5K Ohm, balanced greater than 2.5K Ohm, unbalanced
Input:	
Type:	Electronically balanced RF filtered
Maximum Input Level:	+20dBu at 0dB gain -10dBu at 30dB gain -30dBu at 50dB gain
Remote Attenuation:	
Range:	0-10dB, 0-70dB, selectable via internal jumper
Control (Wiper) Port Sensitivity:	0-7.5Vdc input - 2.66dB/Volt 7.5-15Vdc input - 6.66dB/Volt
Logic Out:	
Maximum Voltage:	25Vdc
Maximum Output Current:	5mA
Phantom Power:	+48 Volts, 4mA maximum current, internal jumper per channel
Sends 1/2 (SND):	
Signal Routing:	Pre or Post Attenuator, jumper selectable
Maximum Output:	+20dBu
Power Consumption:	±140mA at 15 Volts

Specifications subject to change without notice

APPENDIX 1

The Logic Output on each channel of the LP4 is an optically isolated NPN bipolar transistor. This transistor has a breakdown voltage of 25 Volts and will provide a maximum current of 5mA.

Shown below are two possibilities for configuring the Logic Output, depending on whether an active high or active low signal is desired.



LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, we will, at our option, repair or replace any defective parts without charge for either parts or labor. If we cannot correct the defect in your equipment, we will replace it at no charge with a similar new item. We will pay for the cost of returning your merchandise to you.

This warranty applies only to items returned to us, shipping costs prepaid, within one year from the date of purchase.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

LECTROSONICS, INC.

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RIO RANCHO, NM 87124 USA

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