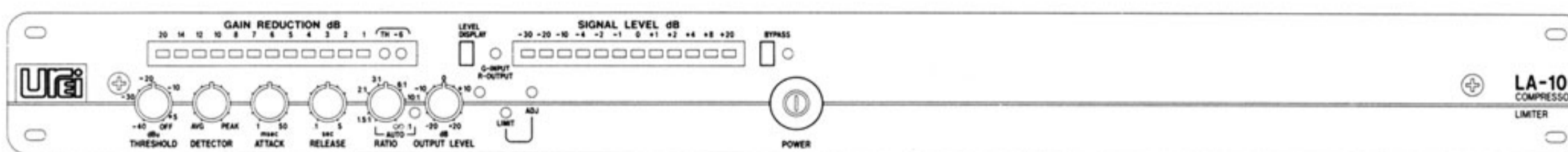


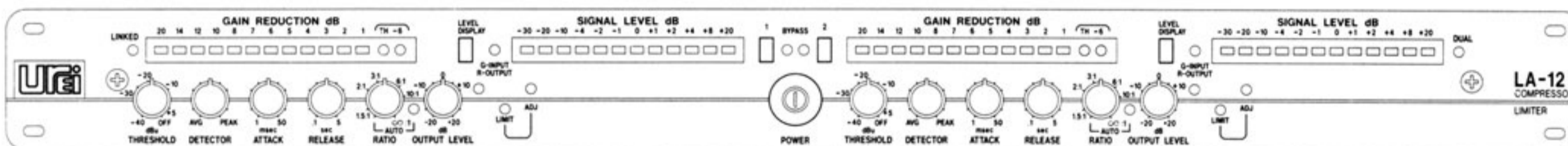


# Owner's Manual

## LA-10 Compressor/Limiter



## LA-12 Two Channel Compressor/Limiter



# Safety Precautions

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## IMPORTANT!

FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:



The symbols shown above are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowhead symbol within an equilateral triangle warns that there are hazardous voltages and the risk of electric shock within the unit. The exclamation point within an equilateral triangle alerts the user to refer to important information in the user manual.

**THESE SYMBOLS ARE A WARNING THAT THERE ARE NO USER SERVICEABLE PARTS INSIDE THIS EQUIPMENT AND THAT THERE ARE HAZARDOUS VOLTAGES PRESENT.**

**DO NOT OPEN THIS EQUIPMENT YOURSELF. REFER ALL SERVICING TO QUALIFIED PERSONNEL. DO NOT MAKE ANY INTERNAL ADJUSTMENTS OR ADDITIONS TO THIS EQUIPMENT AT ANY TIME. DO NOT TAMPER WITH THE INTERNAL ELECTRONICS.**

**FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE A SHOCK HAZARD AND MAY VOID WARRANTY SERVICE TO THIS EQUIPMENT.**

This equipment should be operated only at the voltage indicated on the rear panel. Replace the fuse only with the same type and rating as indicated on the rear panel.

This equipment must be grounded for correct operation. Do not defeat the safety ground by using a ground lift adapter or by physically removing the ground prong from the plug.

The power cord should be routed so that it cannot be walked upon or pinched by items placed upon or against it. The power cord should be unplugged from the outlet when the equipment is to be unused for a long period of time.

This equipment should be located away from heat sources and should be properly ventilated.

Do not expose this equipment to rain or moisture.

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# Important Information • read this first !

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## Unpacking and Checking

Thank you for purchasing this UREI compressor/limiter.

We encourage you to read and to make use of the material contained in this manual. We welcome your comments and suggestions on our products and on this manual.

Unpack the LA-10 or LA-12 and carefully inspect it for transportation damage. If any physical damage is discovered, save all of the packaging and immediately contact the dealer or distributor from whom it was purchased.

## Contents of Shipping Container

**The shipping carton should contain:**

The UREI compressor/limiter with model number as shown on the shipping container

This instruction manual

A packet containing rack mounting hardware and Spare Fuse for 120 and 240 V operation.

AC power cord

Security Cover and screws

**If any items are missing, contact your dealer.**

## Important Information

### ● Stereo or Linked Operation

The LA-12 is a very flexible unit that is capable of operating as two independent compressor/limiters or as a linked pair. For example, the linked mode, may be used when two dissimilar signals need to be controlled together for a special effect. However, this flexibility means that simply engaging the "Linked" switch does not create a true "Stereo" compressor. For Stereo operation, all the controls on each channel must be set identically.

Please refer to Page 14 for further information on Linked operation.

# Product Description

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## LA-10 & 12

The LA-10 and LA-12 Compressor/Limiters combine professional performance with multi-configurable function and control parameters.

The LA-10 is a Single Channel unit while LA-12 is a Dual Channel unit, using the same circuitry as the LA-10 plus a switch for Linked or Stereo operation. The LA-10 and LA-12 are each housed in an industry standard, 1U, EIA 19" rack-mount chassis.

The following description applies to the LA-10 and to each channel of the LA-12.

Each channel has controls for: Threshold, Detector (Average/Peak), Attack, Release, Ratio, and Output Level. The Ratio Control also selects an Auto mode which engages fixed settings for: Peak/Average Detector, Attack, and Ratio and a Program Dependent Release function.

A Smart-Slope™ circuit creates a gradual transition between no and full compression to give a smoother audio response.

An Output Ceiling Limiter is set by a front-panel trim-pot and an LED indicates when this limit is reached. A 12 segment bargraph meter indicates gain reduction over a range from 1 to 20 dB and LEDs indicate when the signal is at and below the threshold. A further 12 segment meter is switchable to display Input or Output Level and its Reference Level is adjustable by a front-panel trim-pot.

A front-panel switch controls a 'hardwire' bypass relay which links input to output and maintains signal flow in the event of a power loss. The relay is also used by a turn-on delay circuit which prevents turn-on transients from affecting the output signal.

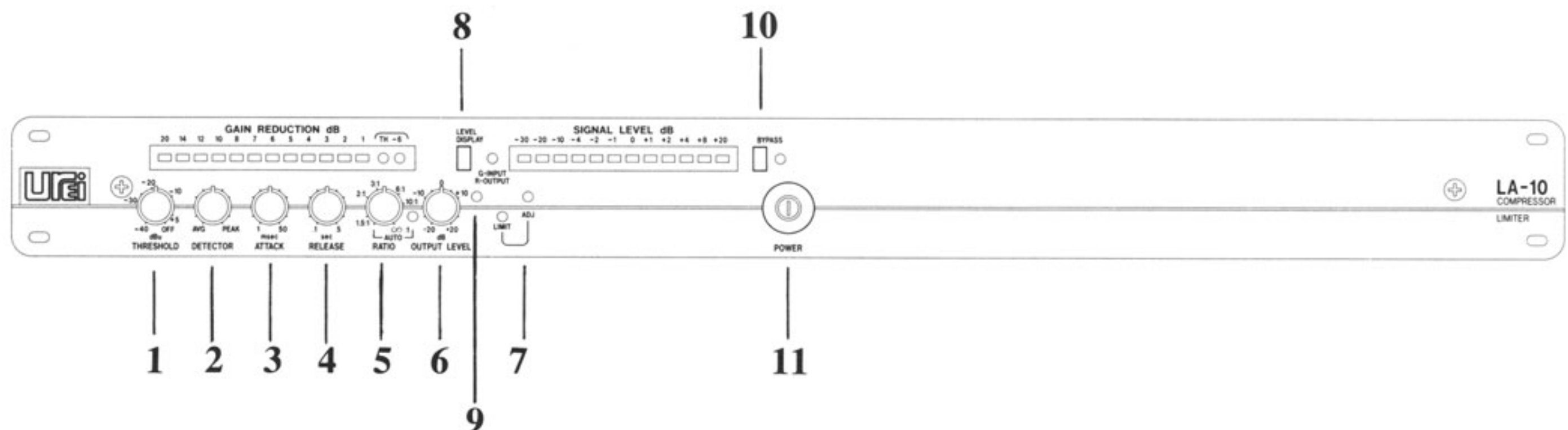
Balanced differential input circuits substantially reduce input noise. The balanced output is a special active transformer-isolated type. A toroidal power transformer minimizes AC hum radiation.

The rear panel carries balanced XLR and ¼" TRS input connectors and balanced XLR output connectors. A balanced ¼" TRS connector allows external access to the detector circuits. A barrier strip allows optional connection of signal and chassis grounds and the linking of the control circuit with those of other LA-10, LA-12 or LA-22 compressors.

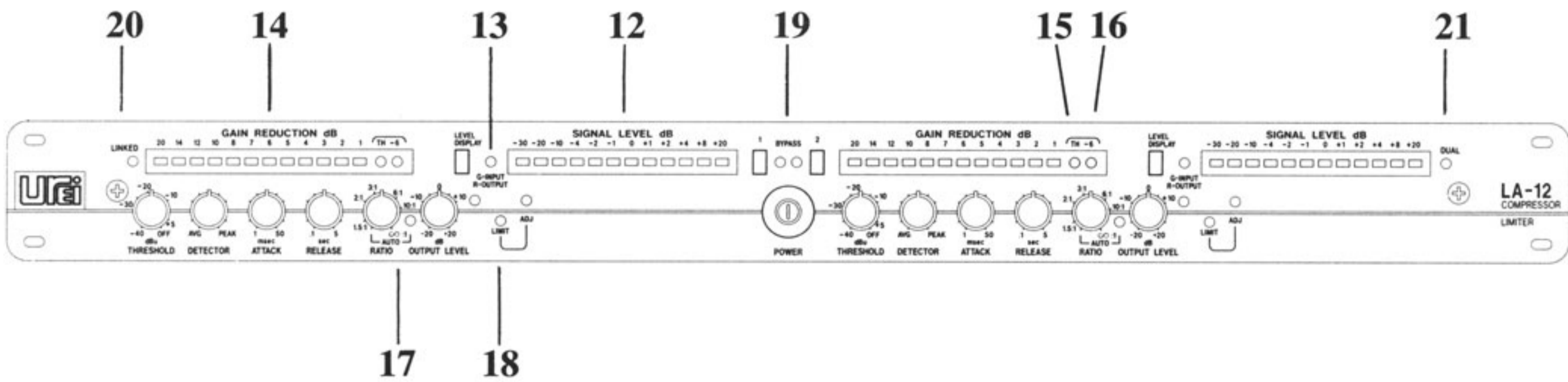
The LA-12 has an additional rear-panel switch which allows the two channels to operate completely independently or with their control circuitry linked for stereo operation. (See page 14)

A security cover may be installed to protect the front panel control settings.

# Front Panel

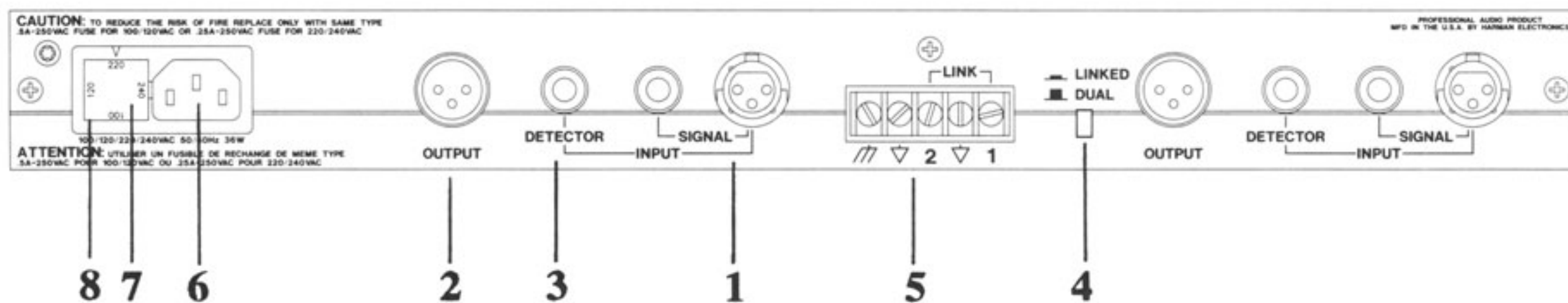


- |                                    |  |
|------------------------------------|--|
| [1] <b>THRESHOLD</b>               | Determines the level at which compression begins. Adjustable from -40 dBu to +10 dB. Turning fully clockwise turns the threshold Off.  |
| [2] <b>DETECTOR</b>                | Adjustable between Average and Peak sensing.   |
| [3] <b>ATTACK</b>                  | Sets the time taken by the compressor to react to the input signal, once the signal level reaches the set threshold.<br><br>AVERAGE DETECTOR - Attack time is adjustable from 1 ms to 50 ms.<br>PEAK DETECTOR - Attack and Release times are fixed. 100 µs Attack and 10 ms Release. |
| [4] <b>RELEASE</b>                 | Sets the time taken for the compressor to return to unity gain as the signal falls below the threshold level. Adjustable from 100 ms to 5 seconds (for 10 dB of Release)   |
| [5] <b>RATIO</b>                   | Adjusts the ratio of the change in input level in dB to the change in output level. Adjustable from 1.5:1 to ∞:1. Rotating pot fully counter-clockwise engages <b>AUTO</b> mode.   |
| <b>AUTO</b>                        | Presets Peak/Average, Attack and Ratio controls and engages a program dependent Release function.  |
| [6] <b>OUTPUT LEVEL</b>            | Provides ± 20 dB of gain to allow level matching.  |
| [7] <b>ADJ (Peak limit adjust)</b> | Trim pot adjusts maximum output ceiling from -10 dBu (CCW) to +24 dBu (CW). Peak Attack and Release are fixed at 50 µs and 40 ms respectively. This function is not linkable between compressors.  |
| [8] <b>LEVEL DISPLAY</b>           | Push-button switches Signal Level meter between Input and Output.  |
| [9] <b>METER ADJUST</b>            | Trim pot adjusts the Signal Level meter's zero reference from -15 dBu to +4 dBu. The reference is adjustable in Output mode only.  |
| [10] <b>BYPASS SWITCH</b>          | Push-button switch engages a relay which directly connects the input to the output, bypassing all active circuitry. The relay is also engaged when the power is off.   |
| [11] <b>POWER SWITCH</b>           | Push-button. Switches both sides of AC line, for added safety.   |



- [12] **SIGNAL LEVEL**      12 segment (green, yellow, red) bargraph indicates output level from -30 dB to +20 dB.
- [13] **INPUT/OUTPUT**      Dual color LED indicates Signal Level meter mode - lights Green for Input or Red for Output.
- [14] **GAIN REDUCTION**      12 segment red bargraph indicates the amount of gain reduction from 1 to 20 dB.
- [15] **TH LED**              Yellow LED indicates when input level is at or above the Threshold.
- [16] **-6 LED**              Green LED indicates when input level is 6 dB below the Threshold.
- [17] **AUTO**                Red LED indicates when the channel is in Auto mode.
- [18] **LIMIT**              Red LED indicates when the adjustable output ceiling is exceeded. See item [7].
- [19] **BYPASS**            Red LED indicates when the channel is bypassed.
  
- LA-12**
- [20] **LINKED**            Yellow LED indicates that Channels One and Two are linked.
- [21] **DUAL**              Red LED indicates separate operation.

# Rear Panel



## Channel 1 and 2 Inputs and Outputs are identical.

- [1] **SIGNAL INPUT** XLR D3F and ¼" TRS connectors feed electronically-balanced input. XLR pin 2 and TRS tip "hot".
- [2] **SIGNAL OUTPUT** XLR D3M connector. Balanced active transformer isolated output. Pin 2 "hot".
- [3] **DETECTOR INPUT** ¼" balanced jack for direct access to the detector circuit. Inserting a plug into this jack opens the internal side chain path so that the detector responds to the input at this jack.
- [4] **DUAL/LINKED SWITCH** Push-button switch links Channels 1 and 2's Gain Reduction circuits.
- [5] **BARRIER STRIP** Ground terminals allow the signal ground of one or both channels to be connected to chassis ground. Link terminals allow the Gain Reduction circuits of any number of LA-10, LA-12 or LA-22's to be linked together.
- [6] **AC RECEPTACLE** accepts IEC NEMA 515P TYPE cord, included (N. America).
- [7] **VOLTAGE SELECTOR** Allows operation on 100, 120, 220 or 240 Volts.
- [8] **FUSE** **USE ONLY THE FUSE VALUE INDICATED ON THE REAR PANEL.**



# Circuit Description

---

## LA-10 & LA-12

**Note:** for clarity, the Block Diagram shows one Channel of the LA-12. The single Channel of the LA-10 and the two Channels of the LA-12 are identical. With the exception of the Link switch, the following description applies to the LA-10 and LA-12.

Each channel has two signal paths: an audio path and a control path.

The level and dynamics of the audio signal are dependent upon the individual control settings and the signal feeding the detector. This signal may be:

1. The Audio input.
2. A separate signal fed to the Detector Input.

### Input

The Audio input has Balanced XLR and 1/4" TRS connectors. A differential amplifier provides common mode rejection. This signal is fed to the VCA and also passes through a switched jack, to the Detector Buffer and the Side Chain. In normal operation, the input signal feeds the Side Chain and the control section reacts to the program material. Alternatively, an external signal may be inserted into the Detector Input jack and the limiter/compressor functions will be controlled by the dynamics of the external signal.

### Side Chain

The side chain has two main sections; a Peak Detector and an Average (rms) Detector. The rms detector has fully adjustable Attack and Release times while the peak detector has fixed Attack and Release times, which are faster than those of the rms detector. A Smart-Slope™ circuit creates a gradual 'soft knee' transition between no compression and full compression for a smoother audio response.

### Controls

The **Threshold** control sets the level above which Gain Reduction will occur. The **Detector** control allows the user to set the ratio between **Average** (rms) and **Peak** Detector response by controlling the level fed to the Peak Detector section. The drive level to the Average Detector is fixed and is not affected by this control. The **Attack** and **Release** controls vary the reaction times of the rms compressor. The **Ratio** control determines the ratio of Input level change to Output level change.

### Auto mode

When the Ratio control is turned fully counter-clockwise, the Auto mode is engaged. In this mode, preset values are used for: Compression Ratio, Average/Peak ratio, and the Attack and Release times of the rms limiter. Front panel controls except Threshold and Output Level are inoperative. These usable controls are distinguished by their blue color. The Auto mode provides an operator with quick and easy access to a setup which should be effective in many applications and which may save time when careful adjustment of the controls is not necessary. The Release time is frequency dependent and is shorter at high frequencies. This allows the release time to be optimized for the signal content while reducing the higher THD normally generated by using fast release times with low frequency signals.

---

## Gain Change and Metering

Based on the signal level and the position of the Threshold, Detector, Attack, Release and Ratio controls, control voltages are generated by the Peak and Average detector sections and summed to form the composite drive voltage used to control the VCA gain. This voltage also drives the Gain Change meter and is available on the Link terminal of the rear-panel barrier strip. It is possible to sum the control voltages of any number of LA-10, LA-12 or LA-22 compressors so that they will all operate identically.

A 12 segment bargraph meter shows gain reduction over a range from 1 to 20 dB and LED's indicate signal levels 6dB below and at the threshold. A second 12 segment meter is switchable to display Input or Output Level. The Output Reference Level is adjustable by a front-panel trim-pot.

## Output Stage and Fast Peak Limiter

An Output Ceiling may be set by means of a separate output limiter section which quickly suppresses any signal level above its threshold. This is adjusted by a front-panel trim-pot and provides protection for equipment such as compression drivers or digital converters which may be susceptible to damage or distortion caused by excessive signal peaks.

The gain control adjusts the output level by -20 dB to +20 dB. The balanced output utilizes a patented, advanced, ultra-low distortion, transformer-coupled audio line-drive circuit. It is capable of delivering +24 dBm into a 600 ohm load with less than 0.001% distortion. Output connection is via a 3-pin XLR connector. A relay provides a 'hardwire' bypass by connecting the input and output in the event of a power loss or when the front-panel switch is engaged. A turn-on delay circuit also engages the bypass relay for approximately two seconds at power-up. In the Bypass mode, no active or passive components are in the signal path and the side chain is inactive and unable to affect any other channel via the Link port. All meter and indicator functions of the bypassed channel are inoperative.

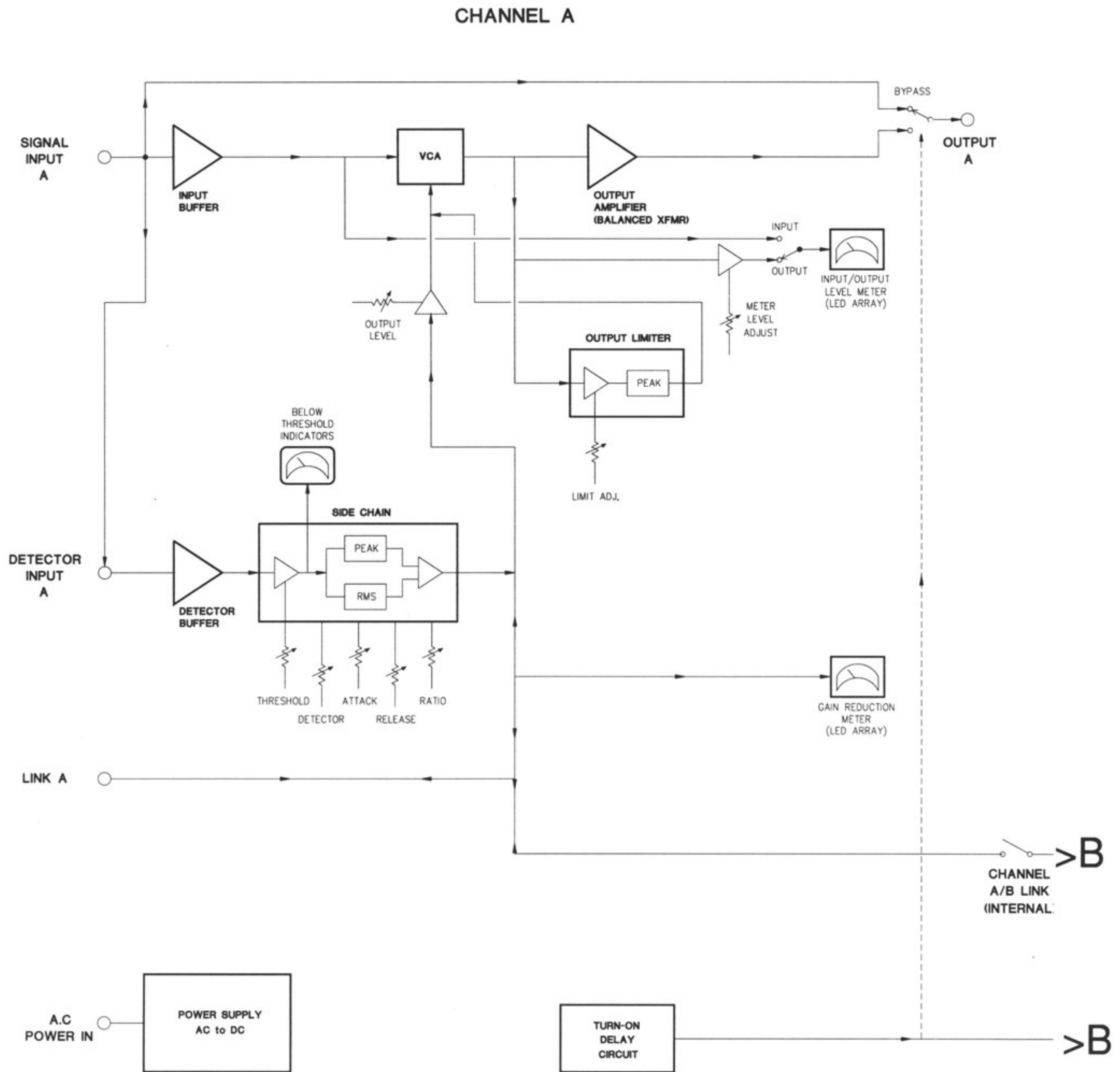
A barrier strip allows optional connection of each channel's signal and chassis grounds and the linking of its control circuits with other LA-10, LA-12 or LA-22 compressors.

## LA-12

A rear-panel switch allows the channels to be linked or to operate completely independently. For **STEREO** applications, the Link switch should be engaged and all controls set exactly the same on each channel. This will maintain a stable stereo image by processing both channels identically. In the Linked mode, the control voltages of both channels are summed together so that any gain reduction caused by the side chain of one channel will cause an equal change in the other channel. Without this link, a stereo image would shift from side to side if one channel were to be compressed when the other was not.

Please refer to Page 14 for further information on linked operation.

# Block Diagram (simplified)



# Voltage Selector and Fuse

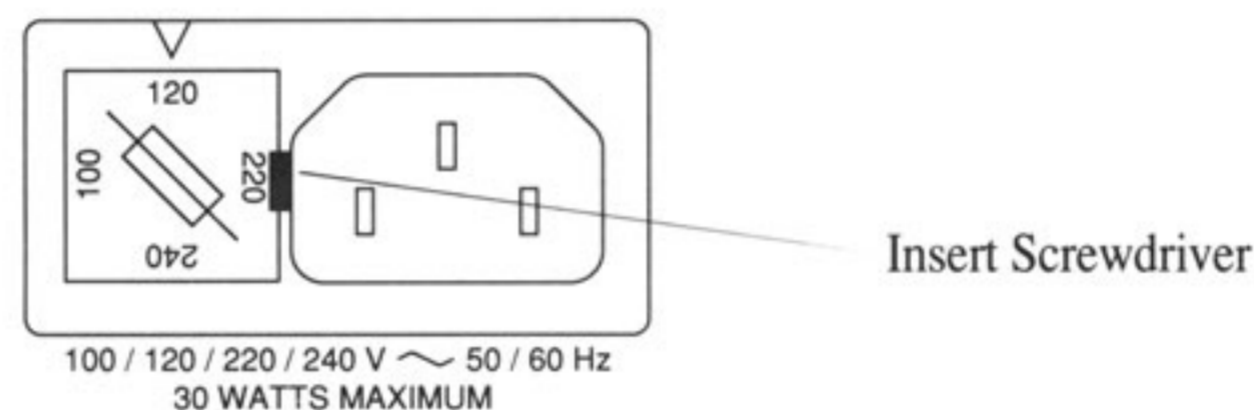
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## CAUTION:

**CHECK THE AC LINE VOLTAGE AT YOUR INSTALLATION AND IF NECESSARY SET THE REAR PANEL VOLTAGE SELECTOR TO THE CORRECT VOLTAGE. CONFIRM THAT A FUSE WITH THE CORRECT RATING IS INSTALLED.**

## IMPORTANT:

**ORIENTATION OF THE FUSE HOLDER DETERMINES THE OPERATING VOLTAGE.**



## WARNING: REMOVE THE AC POWER CORD BEFORE REMOVING THE FUSE HOLDER

The LA-10 and LA-12 can be used with nominal power line voltages of 100, 120, 220 or 240 Volts, at 50 to 60 Hz.

**Voltage selection is accomplished by inserting the correct fuse, listed below, into the fuse block and installing the block into the IEC power connector on the back panel. Notice that the end cap on the block can be installed in four different orientations. The operating voltage is set by rotating the cap so that the supply voltage is at the top, with the triangle above, pointing to it.**

In the illustration above, the cap is oriented for a setting of 120 V. There is a small slot between the right side of the end cap and the line cord socket. The fuse holder is removed by inserting a small flat-bladed screwdriver under the fuse end cap into this slot and gently prying the cap outward.

**Disconnect the AC supply before removing the fuse holder.**

<b>Fuse Ratings:</b>	[Size: 5 mm x 20 mm]
<b>100/120 V</b>	500 mA 250 V Slow-blow
<b>220/240 V</b>	250 mA 250 V T type

## Rack Mounting

Although internal circuitry susceptible to hum pickup is sufficiently shielded from moderate electromagnetic fields, avoid mounting the compressor/limiter near large power transformers or motors etc.

Install the LA-10 or LA-12 in a rack using the rack screws supplied. If the rack is to be transported, the rear of the unit should be supported. Route the AC cord away from audio lines and plug into a convenient outlet.

## Security Cover

Once the compressor/limiter is installed, adjusted, and tested, the security cover (Model SC8) may be secured to the front panel of the unit to prevent tampering with the control settings.

The cover is secured by two the screws supplied.

# Input and Output Connections

## Connectors

**Signal:** The Input connectors are XLR and 1/4" TRS. The Output connectors are XLR.

**Side Chain:** The Side Chain Input is a balanced 1/4" TRS jack.

Wiring Guide for XLR Connectors			
Balanced		Unbalanced	
Pin 2	+ / Positive	Pin 2	+ / Positive
Pin 3	- / Negative	Pin 3	Connect to Pin 1
Pin 1	Shield	Pin 1	Shield

### Polarity

IEC standards for balanced wiring designate XLR Pin 2 as Positive or "Hot" with pin 3 as Negative or "Low".

The LA-10 and LA-12 conform to these standards. Other equipment may or may not conform. Check its manufacturer's specifications.

Wiring Guide for 1/4" TRS & TS Plugs					
TRS Balanced		TRS Unbalanced		TS Unbalanced	
Tip	+ / Positive	Tip	+ / Positive	Tip	+ / Positive
Ring	- / Negative	Ring	Connect to Sleeve	Sleeve	- / Negative
Sleeve	Shield	Sleeve	Shield		

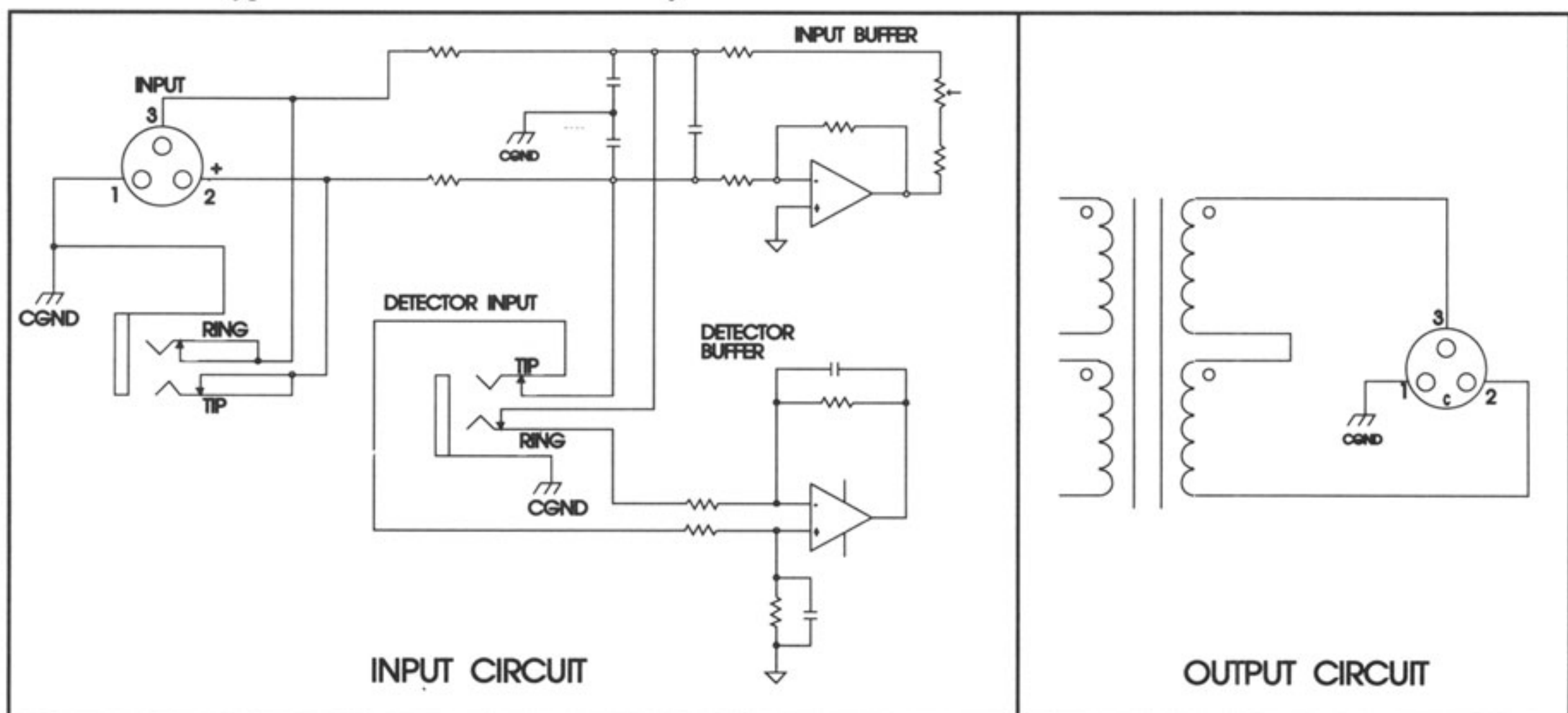
## Unbalanced Connection

**XLR:** Pin 1 may be connected to Ground if that is compatible with your grounding scheme.

**TRS:** The Sleeve may be connected to Ground if that is compatible with your grounding scheme. Alternatively, use a TS jack with Signal to the Tip and Ground to the Sleeve.

## Input and Output Circuits (simplified)

Note: bypass circuit etc. omitted for clarity.

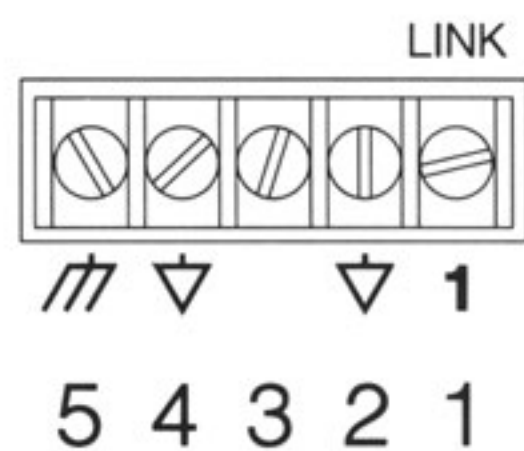


# Terminal Strip

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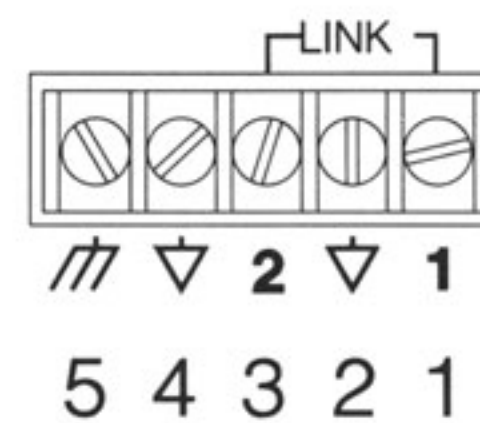
## Ground and Link Connections

### LA-10



Terminal 1	Control Voltage Link
Terminal 2	Signal Ground
Terminal 3	Not used
Terminal 4	Signal Ground
Terminal 5	Chassis Ground

### LA-12



Terminal 1	Channel 1 Control Voltage Link
Terminal 2	Channel 1 Signal Ground
Terminal 3	Channel 2 Control Voltage Link
Terminal 4	Channel 2 Signal Ground
Terminal 5	Chassis Ground

#### Note:

Signal ground and Chassis Ground are internally connected via a 1 k $\Omega$  resistor in parallel with a 0.1  $\mu$ F capacitor.

## Using the Link Switch or Link Terminals and Stereo Operation

The LA-12 contains two completely independent compressor/limiters in a single package. There are two modes of operation: "Dual" (separate) or "Linked". Linking may be done via the terminal strip or the rear-panel switch - the result is the same. The Link terminals allow the control voltages of any number of LA-10, LA-12 or LA-22's to be summed so that all units have the same gain change.

The buffered detector signals are fed to independent attack and release shaping circuits. When the Link function is enabled (by wire link or switch), the outputs of these control circuits are summed together. Both channels' variable gain circuits are now fed by a single composite voltage and the amount of gain change will be identical for each channel.

**Note - Stereo Operation:** It is important to note that the "Linked" mode does not create a Stereo Compressor/Limiter **unless all controls on both channels are set identically.**

Note also, that whenever channels or units are linked, the channel having the greater effect on the gain change circuit at that particular time, will take precedence. As the signals vary and each parameter modifies the control voltage, the dominant channel may alternate from Channel One to Channel Two or vice-versa. Assuming that the signal level on each channel is above its threshold, the gain change characteristics will be a composite of the shorter attack time, the longer release time and the higher ratio. The channel which reaches its threshold first will take control first, however, dependent upon the program material and dynamics, the dominant channel could change as the second channel reaches its threshold.

If the threshold control of a channel is set to "Off", all of its controls are inoperative and its gain change will be controlled by any linked channel(s). If a channel is in Bypass, there is no gain reduction and that channel is not capable of controlling or being controlled through the Link terminals.

# Grounding and Safety

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## Grounding

Grounding is a complex subject and is critical to obtaining optimum performance from a sound system. Good grounding practices have three goals:

- 1) Safety.
- 2) Maintenance of system integrity.
- 3) The prevention of oscillation and hum which may be caused by differing potentials within the system, RFI (Radio Frequency Interference) or Electro-Magnetic Induction.

## Safety

For safe operation, the unit must be connected to a good mechanical *safety* ground. This provides a current path for any voltage which might appear on the chassis due to an electrical fault in the unit. Without this path, the unit might be a shock hazard. In addition, a good quality ground on the chassis provides shielding from external fields and minimizes radiation of internal fields to other components.

To comply with safety regulations and to protect our customers, we provide this product with a ground connection through a three-wire power cord. The rear panel barrier strip allows the audio ground to be separated from this chassis ground to eliminate hum caused by ground loops.

The most common cause of ground loops is duplicate grounding, which occurs when a component is grounded via its own AC connection and has a second path to ground through a cable shield to another component's chassis ground. These different path lengths may cause a significant potential between the **audio** ground of the signal source and the **mechanical** ground to which the unit has been connected. A voltage is developed, which induces a spurious signal - usually hum - into the signal wiring.

Attention to grounding should eliminate ground loops. See also "In Case of Difficulty".

## "Telescoped Shields"

By connecting the shield at one end only, each piece of equipment may be grounded for safety while potential ground loops are avoided. Traditionally, the connection is at the destination, so that any induced signals will flow with the signal and take the most direct path to ground. Should you prefer to lift the shields at the destination and ground them at the source, you must be consistent and follow this convention throughout the system.

## Twin Conductor Cable - Unbalanced Sources

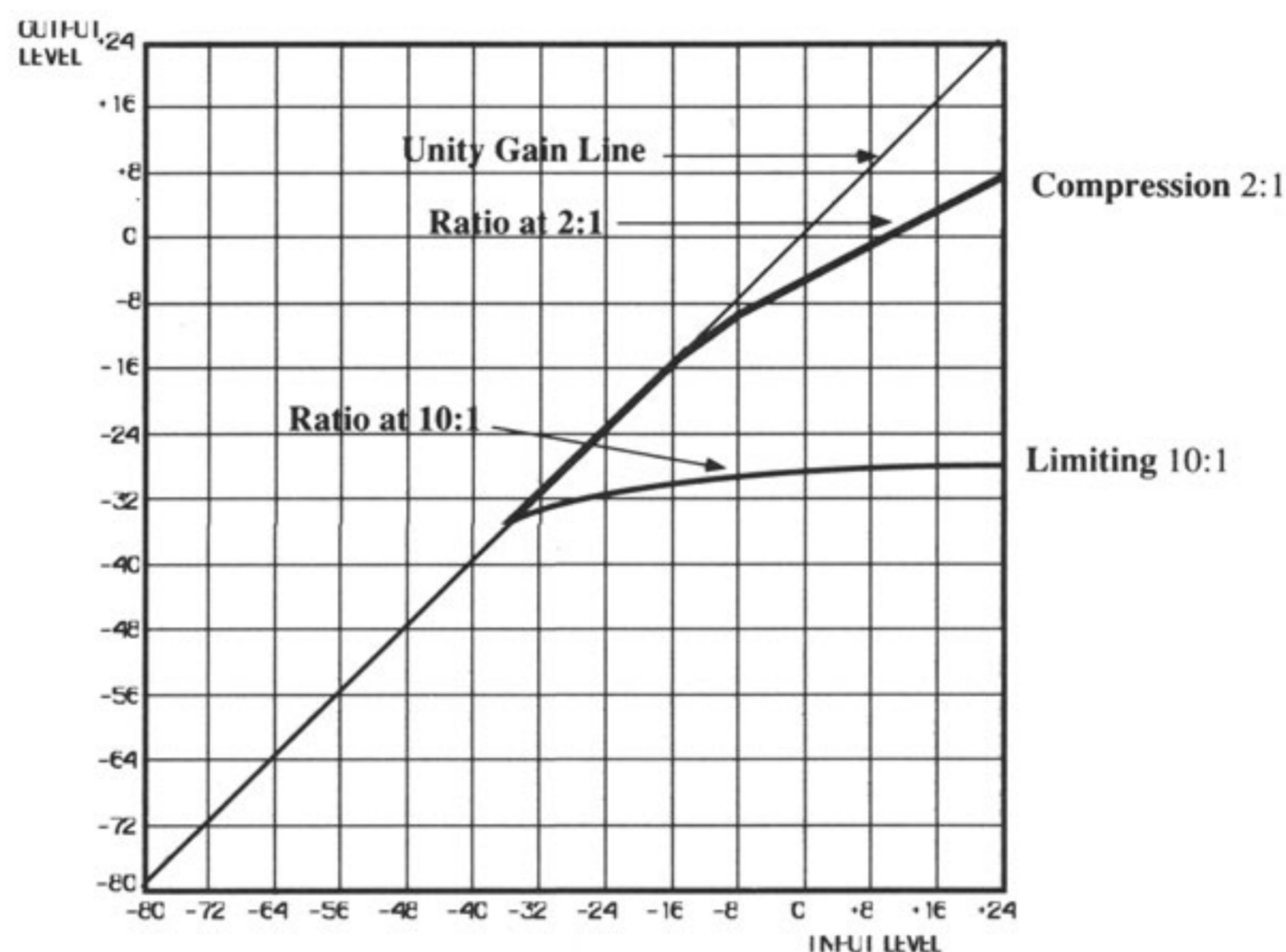
The LA-10 and LA-12 have differential, balanced input circuits. Balanced wiring is recommended, even with unbalanced sources - especially when running long lines. This takes advantage of the ability of a balanced input to reject signals (such as hum fields) which are induced equally into each of the signal carrying conductors (Common Mode Rejection). Also, twin-conductor, shielded cable is more reliable, since it does not depend on the shield wire itself to complete the signal connection. Stranded shield wires are more vulnerable than the protected internal wires, especially in portable installations. A broken ground connection would result in a loss of audio or a very loud hum. Using twin-conductor cable, a broken shield may only result in a slight increase in noise or hum due to the lack of shielding.

## Long Cable Runs

Longer input cables should be balanced or floating to reduce susceptibility to RFI and hum. If the output of the device feeding the LA-10 or LA-12 is balanced or floating, simply use a dual-conductor shielded cable. If the source is unbalanced, a transformer may be necessary at the source's output, to supply a balanced signal.

# Functional Description

The gain-controlling functions of a compressor or limiter may be represented on a plot of output level vs. input level. As shown below, the input level (in dB) is plotted on the X-axis and the output level on the Y-axis. The straight diagonal line from the lower left corner to the upper right corner represents unity gain. At any point on this line, the output level equals the input level.



Two plots are shown, representing the gain curves of two different setups using the UREI LA-10 or LA-12. The bold lines represent a deviation from unity gain caused by compression. At low signal levels, the gain curves are identical. When the input signal is above -36 dBu, the curves separate, indicating different threshold and ratio settings.

The lower of the two curves shows the compressor threshold set at -32 dB. When the input signal level rises above this threshold, the curve flattens out and diverges from the unity gain line. The ratio shown here is 10:1. For every 10 dB increase in the input signal, the output increases by only 1 dB. Compression ratios of 10:1 and above are normally described as Limiting. Note that instead of an abrupt change in slope from the unity gain line to the 10:1 compression ratio, there is a rounded corner. This is achieved by the Smart-Slope™ circuit and is referred to as a “soft knee”. Soft-knee compression is more natural sounding and pleasing to the ear since there is a gradual change in signal dynamics when the compressor threshold is reached. In the case above, the soft knee means that compression begins, with a lower ratio, just below the threshold and increases gradually to full compression above the threshold.

The upper curve shows the effect of Compression at a threshold of -8 dB and a ratio of 2:1 and shows the more subtle change in slope that such a ratio produces. With lower ratios, the soft knee is less apparent because there is only a minor change of slope.



# Definition of Terms

---

## Terms used in this manual

**THRESHOLD** is the point at which compression begins. For example, if the threshold is set at -20 dB, signals below that level are not affected by the compressor. Once the input signal increases above -20 dB, the output signal will be reduced by an amount dependent on the **RATIO** setting and the amount that the signal is above the threshold. For **COMPRESSION**, the threshold is usually set quite low, so that even low level signals will activate the compression. For **LIMITING**, the threshold is usually set quite high, so that the dynamics of the signal are preserved, but extremely high levels are reduced to protect amplifiers, speakers or prevent tape saturation.

A **DETECTOR** generates a DC voltage proportional to the amplitude of an audio signal. This voltage is used to control a variable gain device such as a VCA (Voltage Controlled Amplifier). Detectors may be designed to react to the average (rms) level of the signal or to peak levels.

**RATIO** is the relationship between input and output level. For example, if the input signal increases by 3 dB, while the output signal increases by only 1 dB, then the compression ratio is 3:1 - Typically, **COMPRESSION** is defined as a ratio of 10:1 or less and **LIMITING** as a ratio greater than 10:1.

One problem with constant ratios, in which the ratio does not vary regardless of input level, is an abrupt or unnatural sounding compression. The **UREI Smart-Slope™** circuit provides **SOFT KNEE** compression and minimizes this problem by starting to compress, at a lower ratio, just below the threshold and gradually increasing to the full setting of the ratio control as the level increases.

Once the signal level reaches the threshold level, the time taken before compression begins is called the **ATTACK TIME**. Conversely, the time taken by the compressor to return to normal gain after the signal falls below the threshold, is called the **RELEASE TIME**.

**COMPRESSION** is used to reduce Dynamic Range and hold signals within a given level range or to control signal levels for special effects or other modification purposes.

**LIMITING** is generally used to automatically reduce peak signal levels that are too great to be handled by succeeding equipment, such as signal processors, digital converters, recording equipment, amplifiers, and speakers.

# In Case of Difficulty

---

## Symptom: No Sound

### Possible Causes:

#### Power Off:

**Check that a fuse of the correct rating is installed.**

Check that the Voltage Selector is set correctly for your AC supply.

Check that the various LEDs on the front panel of the compressor/limiter are lit. If not, confirm that the power switch is on (locked in) and that the compressor/limiter is connected to an active AC power source.

#### Power On - No Signal Audible:

Confirm that active audio lines are connected to the signal input(s).

Check that the controls are advanced sufficiently to allow signal to pass.

## Symptom: Weak and/or Distorted Audio

Check that a clean signal is being fed to the compressor. It is possible that the compressor/limiter is reproducing problems originating elsewhere in the audio chain.

Confirm that the input wiring is correct. If only one side of a floating audio line is connected to the input, the resultant audio will be weak and distorted, with a poor frequency response.

Check that the input line is not being loaded down by too low an impedance. This can occur if more than one terminating resistor is connected across the line, or if the same line is feeding the inputs of multiple devices without isolation, particularly if the unit feeding the line does not have a low output impedance. Confirm that the output impedance specification of the feeding device and the input impedance specifications of the device(s) connected to it are compatible.

Check by removing other devices.

## Symptom: Hum and/or Buzz

Check that the grounds of the audio signal path and the chassis and power line of all units in the system are connected according to your system's grounding scheme.

Try connecting the chassis and audio grounds on the terminal strip. The chassis ground is connected to mechanical *safety* ground for shock protection.

### Hum - Ground loop

In some instances, the voltage difference between the grounds will be so great that a direct connection between grounds is not possible without hum in the output.

The use of an isolation transformer in the input signal line may allow the signal to be connected while maintaining ground isolation.

Remember, for safety you must still have a connection to chassis ground. Do not lift a safety ground or remove the ground pin from an AC power cord.

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**Hum - Other Possible Causes:**

Check the audio at an earlier stage in the chain to confirm that the noise is not already in the input signal.

Power amplifiers have large power transformers which handle high currents, and consequently have significant magnetic fields surrounding them. Some low level equipment is susceptible to hum being induced from external magnetic fields. As a general rule, low level equipment should not be mounted in close proximity to power amplifiers to avoid induction of this type of hum.

Be certain that all audio wiring except for loudspeaker lines is well shielded, and that low level wiring is not run parallel to or in close proximity to AC power wiring, particularly high current and/or lighting lines. If the buzzing changes character or intensity when electrical lighting conditions change, the noise is being induced into the audio from the lighting equipment. It is always advisable to run lighting equipment from its own power source and the audio equipment from a separate source. The services of a qualified electrician may be required to solve such problems.

**Symptom: Intermittent Audio**

Check the other equipment and the wiring to make certain that the signal is not intermittent earlier in the chain and that the connectors are solidly connected to the compressor input and output.

# Specifications

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## Performance

<b>Frequency Response:</b>	±0.2 dB [20 Hz to 20 kHz]
<b>THD:</b>	< 0.006% typ. 0.02% max., @ 1 kHz. @ +14 dBu Input
<b>Signal to Noise Ratio:</b>	Referenced to Maximum Output (+24 dBu) 110 dBA, 22 kHz A-weighted Noise Bandwidth
<b>Residual Noise Floor:</b>	-86 dBA, 22 kHz Noise Bandwidth, A-weighted
<b>Dynamic Range:</b>	>115 dB
<b>Channel Separation:</b>	
<b>LA-12</b>	≥ 91 dB, 20 Hz to 20 kHz

## Signal Input

<b>Type:</b>	Electronically Balanced
<b>Connectors:</b>	XLR + ¼" TRS (Tip, Ring, Sleeve)
<b>Polarity:</b>	Pin 2 + Tip "hot"
<b>Maximum Input Level:</b>	+24 dBu (12.3 V rms)
<b>Input Impedance</b>	
<b>Balanced:</b>	40 kΩ
<b>Unbalanced:</b>	20 kΩ
<b>Common Mode Rejection:</b>	≥ 60 dB @ 1 kHz

## Detector Input

<b>Type:</b>	Balanced
<b>Input Impedance:</b>	100 kΩ
<b>Connector:</b>	¼" TRS (Tip, Ring, Sleeve)

## Output

<b>Type:</b>	Balanced, active transformer-isolated
<b>Connector:</b>	XLR
<b>Polarity:</b>	Pin 2 "hot"
<b>Gain:</b>	± 20 dBu
<b>Maximum Output Level:</b>	+24 dBm
<b>Output Impedance:</b>	< 75 Ω
<b>Bypass:</b>	"Hardwire" bypass relay - controlled by switch. Automatic in power-off condition.

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## Controls

<b>Threshold:</b>	-40 dBu to +10 dBu and "Off"
<b>Detector:</b>	Average/Peak, continuously variable.
<b>Attack Times:</b>	1 msec to 50 msec (Average detector) 1 µsec (fixed) (Peak detector)
<b>Release:</b>	0.1 seconds to 5 seconds for 10 dB of release
<b>Ratio:</b>	1.5:1 to ∞:1 + Auto mode
<b>Maximum Output Ceiling:</b>	Trim pot adjustable from -10 dBu to "Off" Peak Attack and Release are fixed at 50 µsec and 40 msec
<b>Output Metering:</b>	Zero Reference is adjustable from -15 dBu to +4 dBu

## AC Power

<b>AC Protection:</b>	Fused AC receptacle on rear panel (fuse size 5 mm x 20 mm)
<b>100/120 V:</b>	500 mA 250 V Slow Blow
<b>220/240 V:</b>	250 mA 250 V T type
<b>Operating Range @ 120 V setting:</b>	117 V ±10% (105 V - 129 V)

## Environment

<b>Operating Temperature:</b>	0° C to 50° C
<b>Cooling:</b>	Natural Convection

## Physical

<b>Front Panel:</b>	1U EIA Rack Mounting; 283 x 45 mm (19 in x 1.75 in)
<b>Depth Behind Panel:</b>	260 mm (10.2 in) less connectors
<b>Net Weight:</b>	3.9 kg (8.5 lb)
<b>Shipping Weight:</b>	6.4 kg (14 lb)

## Safety

Designed to comply with UL, CSA and TUV Standards.  
Approvals pending.

# Maintenance and Warranty

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## Maintenance

This UREI product is all solid state, ruggedly constructed and uses the finest components. As such it will provide years of trouble free use with normal care. All parts are conservatively rated for their application. No *special preventive maintenance is required.*

The metal and plastic surfaces of the unit may be cleaned with a damp cloth. In case of heavy dirt, a non-abrasive household cleaner such as Formula 409<sup>®</sup> or Fantastik<sup>®</sup> may be used. Do not spray the cleaner directly onto the front of the unit, as it may destroy the lubricants in the switches and controls! Spray cleaner onto a cloth and then use the cloth to clean the unit.

**THERE ARE NO USER SERVICEABLE PARTS INSIDE.**

**REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.**

## Warranty

This product is warranted by the manufacturer to the original USA purchaser against defects in material and workmanship for a period of two years from the date of purchase. If this product was purchased in another country, contact your UREI dealer or distributor for information on the terms of the warranty applicable in your country. We require that you retain a copy of your dated sales receipt for proof of warranty status.

### **USA purchasers only:**

If your UREI product ever needs service, please write or telephone:

UREI  
JBL Professional (Attn: Customer Service Department),  
8370 Balboa Boulevard,  
Northridge, CA 91329  
(818 / 893-8411).

UREI may direct you to an authorized UREI Service Agency, or ask you to return your unit to the factory for repair. In either case, you will need to present the original bill of sale to establish the date of purchase. **DO NOT** ship your UREI product to the factory without prior authorization.

All products shipped to the factory must be accompanied by a Return Authorization (R.A.) Number and must be shipped prepaid. COD shipments will not be accepted.

Field repairs are not normally authorized during the warranty period, and repair attempts by unqualified personnel may invalidate the warranty.

Customers outside the USA should contact their local UREI dealer or distributor for warranty assistance. Do not return products to the factory unless you have been given specific instructions to do so.