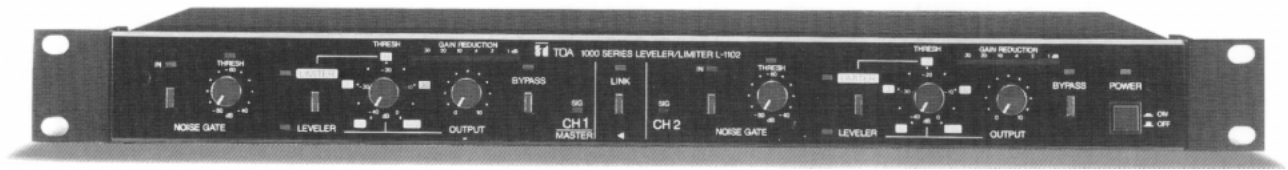

TOA PROFESSIONAL SOUND SYSTEM

DUAL LEVELER/LIMITER

L-1102



FEATURES

1. Two channels of processing.
2. Easy set up and operation.
3. Leveler mode.
4. Limiter mode actively monitors the amplifier outputs.
5. Noise gate for each channel.
6. Leveling function for "constant" outputs.
7. Gain reduction meter with VU type characteristics.
8. Signal dependent attack/release times for smooth operation.
9. Electronically-balanced inputs and outputs with optional transformers.
10. Security cover included.
11. Barrier strip type screw terminals for all input/output connections.

DESCRIPTION

TOA's L-1102 Leveler/Limiter is a two-channel, multipurpose device. Each channel can function independently as a LEVELER or LIMITER and a NOISE GATE. The L-1102 is easy to set up and operate but is versatile and flexible enough to perform a number of valuable functions in a wide variety of system applications. Because it has two channels, it can perform multiple functions in a system. For example one L-1102 can simultaneously perform all three of its functions for a mono signal path. Using the two channels independently, noise gating and either leveling or limiting can be used independently on both channels. Functions can be linked for two channel systems where it is desirable to maintain the same gain in both channels such as for stereo or multi-way speaker systems.

The attack and release times for the gain reduction in both LIMITER and LEVELER modes are signal dependent. The action is fast when it needs to be, without pumping, sudden level shifts or other adverse effects, while still maintaining the relative dynamics of the audio. Setting up the L-1102 is only a matter of selecting the desired functions, setting the leveler/limiter threshold and the noise gate threshold (if activated). The only other adjustment is to set the desired output level using the output gain control (leveler mode only).

The L-1102 has electronically balanced inputs and outputs. Optional high quality input (LT-101) and output (LT-102) transformers are available where input/output isolation is required. The sense inputs for the LIMITER mode are bridging (100k Ω) allowing connection to the amplifier outputs using standard shielded pair audio cable.

As a leveler, an L-1102 channel will maintain a constant output level even though the input may increase over 40dB above the user set threshold. This is an ideal function for digital equipment, because it can eliminate the chance of overloading a digital device's input and avoid the adverse effects of digital distortion. As a leveler, it can also be adjusted to provide a relatively constant output for widely varying inputs levels, such as are encountered in public address and paging systems or in background music systems using CD's (notorious for disk to disk level variations). The L-1102 is adjusted just below gain reduction for the lowest level signals. The desired listening level is then set using the output gain control. This level will then remain constant regardless of increases in the input level. With two channels, stereo signals can be leveled by using the LINK function. In this way any gain changes in either channel will affect both thus maintaining correct left/right level balance. When used as a limiter, an L-1102 channel's sense input is connected to the power amplifier output. The limiting is automatically activated when the amplifier output exceeds the user established threshold. Because the limiting function is controlled by the actual signal going to the

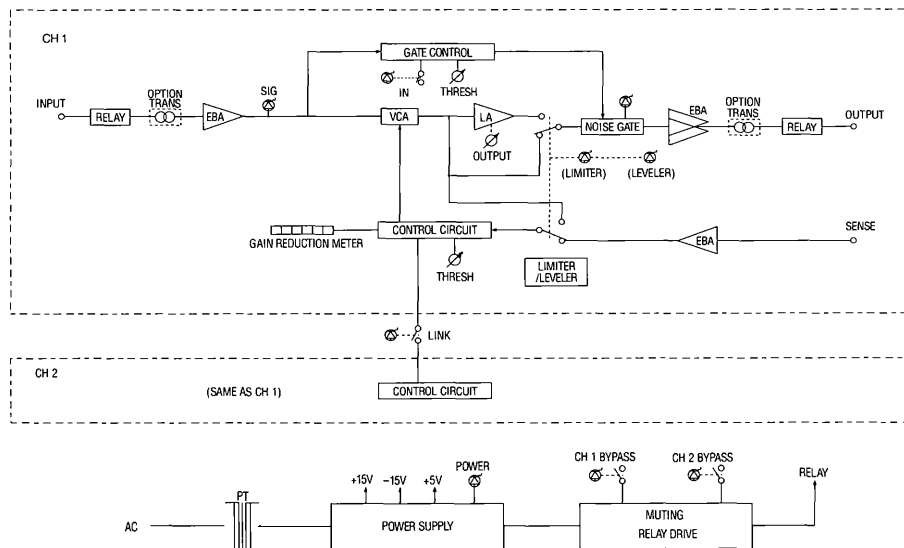
speaker, neither changes in system level settings nor the gain of the amplifiers used will have any effect on the limiter setting. Conversely, all equalization and filtering of the signal will affect the limiting. This means the L-1102 will not respond to signals that the speaker would never "see" in the first place.

With the limiting threshold properly set, there is no amplifier clipping or resulting distorted sound from the system. Any type of speaker can be protected up to 2500 watts (4ohms) either passively or electronically crossed over. The L-1102 also protects constant voltage systems (25V, 70V and 100V) from being overdriven into distortion. With two channels it can protect both the high and low frequency sections of a bi-amped system. By using the LINK mode the high/low frequency level balance can be maintained if either section is driven into limiting. (To do this, in some situations a simple pad may be needed on one of the two sense inputs.) For stereo applications, the LINK function will automatically maintain the left/right level balance even if only one channel goes into limiting.

Indicators on the front panel indicate the modes selected, signal presence and amount of gain reduction. The LED bargraph meter indicating the amount of gain reductions is calibrated similar to a VU meter scale and ballistics without the size and mechanical limitations of the real thing. This clearly shows the "soft knee" entry into more extreme gain reduction and thus allows more precise setups for all applications by minimizing unnecessary over protection. Both channels have a NOISE GATE that can be switched in or out. An indicator lights when it is switched in. The noise gate functions to reduce the gain of L-1102 channel by 20dB if the input signal falls below the user set threshold. An indicator light comes on when this happens. The gate can virtually eliminate excessive idle noise in a system from noisy equipment. It can also get rid of lower level noises picked up by microphones. This is particularly useful for low height ceiling speakers under balconies or in meeting rooms where this reproduced noise is usually more obvious to the listener. In systems needing high dynamic range-- both high gain and high output level -- electronic noise can be particularly troublesome. The L-1102's noise gate can add over 15dB to the effective dynamic range of the system and, at the same time, protect the system using the LIMITER function.

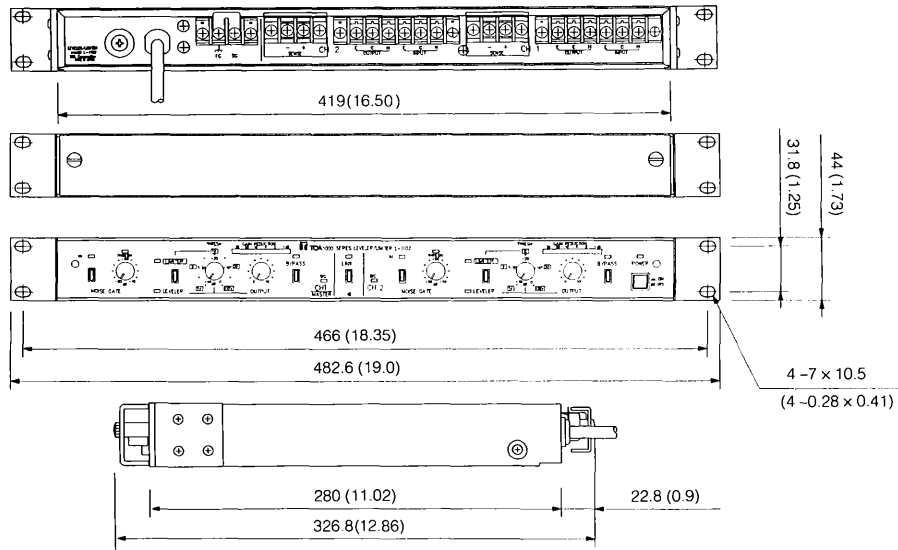
There is a manual BYPASS switch for each channel on the L-1102, along with a bypass-on indicator. BYPASS can be used to turn off all of a channel's functions if they are not required for certain events, or for system testing. Connections for all inputs and outputs are barrier strip type screw terminals. A security cover is included to guard against disturbance of or tampering with the settings. The L-1102 occupies one standard EIA rack space.

BLOCK DIAGRAM



APPEARANCE AND DIMENSIONAL DIAGRAMS

Unit: mm (in.)

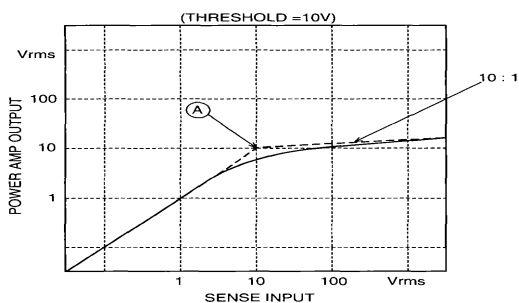


COMPRESSION CURVES

1. Limiter (Speaker protection)

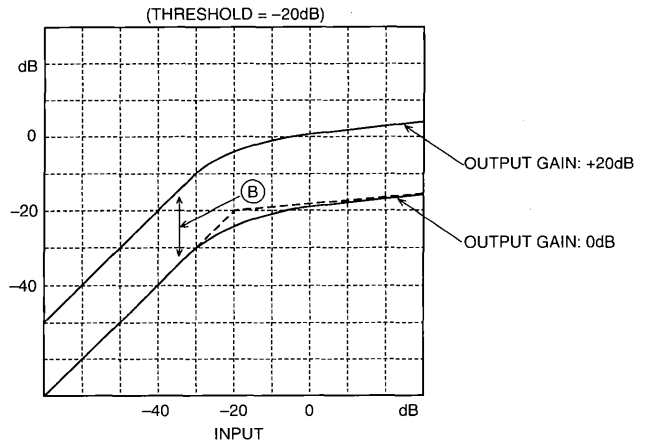
The power amplifier output is connected to the sense input screw terminal as a sense signal. If the sense signal level exceeds a predetermined threshold value, the limiter compresses the output.

As can be seen from a compression curve in the figure below, the output amplitude is linear with respect to the input up to the threshold (A) and gentle and constant thereafter for compression in the ratio 10 (input) to 1 (output). (The leveler/limiter threshold control knob is set to the threshold A.)



2. Leveler

If the input signal level exceeds a predetermined threshold value, the output is compressed. The output gain can be adjusted from 0dB to +20dB (range B) using the output level control (Note: the control is marked "0"- "10")



SPECIFICATIONS

PERFORMANCE	
Frequency Response	20Hz to 20kHz (± 1 dB)
Total Harmonic Distortion	Under 0.1% (1kHz, rated output) Under 0.2% (1kHz, 30dB compression)
Noise Level	Under -92dBA (noise gate off)
INPUT & OUTPUT	
Nominal Input Level	+4dB, 10k Ω input impedance (electronically balanced)
Nominal Output Level	+4dB into 600 Ω load (electronically balanced)
Maximum Input Level	+20dB
Maximum Output Level	+20dBm
Sense Input	100k Ω input impedance
Maximum Sense Input	160V (Limiter off) Over 1000V (Limiter on)
Threshold Level Range	
Leveler	-40dB to 0dB (ref. to input)
Limiter	1.0V-100V RMS (ref. to sense input)
Noise Gate Threshold Range	-80dB to -40dB
Noise Gate Attenuation	20dB
Output Gain (leveler mode only)	Unity to +20dB (adjustable)
Attack Times	Dependent on input (or sense) signal Nominal 1msec(\pm) at 10dB compression
Release Times	Dependent on input (or sense) signal Nominal 0.5sec(\pm) at 10dB compression
Compression Ratio	10:1 above "soft knee" threshold
CONTROLS AND PANEL FUNCTIONS (Front Panel)	
Operating Controls (per channel)	Noisegate..... In/out Noise gate Threshold Select switch Limiter/Leveler Leveler/Limiter.....Threshold Output (gain).....Leveler only Bypass On/off
Operating Controls (common)	Power On/off Link On/off
LED Indicators (per channel)	Noise gate In Noise gate Signal below threshold Selection Limiter or Leveler Meter 0 to -30dB gain reduction Signal presence ... Less than -30dB at input Bypass On
LED Indicators (common)	Power On Link On
POWER	
Power Requirements	AC Mains, 50Hz/60Hz
Power Consumption	14W (120V AC version) 15W (220/240V AC version) Fuse 3AG 1/4A
PHYSICAL	
Finish	Black
Dimensions	482.6W x 44.0H x 316.8D mm (19W x 1.73H x 12.47D in.)
Weight	4.0kg (8.8lbs.)
Accessories	SecurityCover..... 1 Spare Fuse 1

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

The device shall be dual channel with each channel able to function independently as a noise gate and as a signal leveler or limiter. Nominal output level shall be +4dB into 600 Ω (maximum +20dB), electronically balanced, at less than 0.1% THD at 1kHz. Distortion with 30dB compression shall be less than 0.2% THD at 1kHz. Hum and noise shall be more than 92dB (1HF A) below 0dB. Frequency response shall be ± 1 dB (ref. 1kHz) from 20Hz to 20kHz. Nominal input level shall be +4dB (maximum +20dB); input impedance 10k Ω , electronically balanced. Gain below the gain reduction threshold shall be unity in LIMITER mode and adjustable from 0dB to +20dB in LEVELER mode. The limiter sense input impedance shall be 100k Ω with a maximum input of 160V (limiter off).

The unit shall accept optional line input (LT-101 10k ohms:10k ohms) and output (LT-102 600 ohms:600 ohms) isolation transformers. The transformers shall mount easily and securely inside the unit with the machine screws provided. Electrical connection to the unit shall be easily accomplished by means of flexible wires with locking connectors. Front panel switches shall select the mode of operation for each channel: LEVELER or LIMITER select, NOISE GATE in/out, BYPASS in/out and LINK on/off. In LEVELER mode the threshold for leveling shall be adjustable from 0dB to -40dB. In this mode the output gain of the unit shall be adjustable from 0dB to +20dB. In LIMITER mode the sense signal shall be from the output of an external device such as a power amplifier. The limiting threshold shall be adjustable from 1.0V to 100V (+2dB to +42dB). The gain reduction method for both modes shall be a 10:1 ratio with a "soft knee" threshold. Attack and release times shall be signal dependent with a nominal attack time of 1msec(\pm) and release time of 500msec(\pm) at 10dB gain reduction. With the NOISE GATE in, the unit shall reduce its gain by 20dB when the input signal is below a threshold adjustable from -40dB to -80dB.

In LINK mode the VCA circuits shall be linked such that the leveling/limiting threshold for both channels is controlled by the channel 1 threshold setting with the channel 2 threshold control being inactive. However, the highest sense signal from either channel shall control both VCA circuits so that the gain for both channels is always the same. In LINK mode all functions, except the limiting/leveling threshold, shall operate independently for each channel. In BYPASS mode the channel shall be electrically bypassed from the input/output transformers. Front panel indicators for each channel shall include: noise gate in; noise gate threshold (input signal is below threshold); leveler or limiter mode; bypass on; signal presence (above -30dB input signal); gain reduction meter (0dB to -30dB VU scale). A link in and power on indicator shall also be provided.

The rear panel shall have the following: barrier strip type screw terminals for signal input and output and sense connections; a jumper to separate the signal ground from the chassis and a fuse holder with a replaceable 1/4 amp fuse with 1 spare fuse provided.

Power consumption shall be 14 watts at 120V AC (15W 220/240V AC version). The unit shall be enclosed in a durable, painted, black 1.0mm (0.04in.) steel enclosure mechanically reinforced by a 2.0mm (0.08in.) thick, black anodized, aluminum front panel. Overall dimensions shall be 482.6W x 44.0H x 316.8Dmm (19W x 1.73H x 12.47D in.). Weight shall be 4.0kg (8.8lbs.). Standard E.I.A. equipment rack mounting and a smoked plexiglas security cover shall be provided.

The 2 channel leveler/limiter/noise gate shall be the TOA model L-1102.

NOTE: 0dB= 0.775V RMS

OPTIONAL ACCESSORIES

	LT-101 Input Transformer	LT-102 Output Transformer
Model No.	LT-101 Input Transformer	LT-102 Output Transformer
Impedance	10k Ω : 10k Ω	600 Ω : 600 Ω
Frequency Response	30Hz to 20kHz (± 0.15 dB)	30Hz to 20kHz (± 0.15 dB)
Distortion	Under 0.2% (50Hz, 5dB)	Under 0.2% (50Hz, 5dB)
Constant Loss	1.5dB (at 1kHz, 1V)	1.5dB (at 1kHz, 1V)
Weight	44g (0.1lb.)	44g (0.1lb.)
Accessories	Sleeve 2 Screw 2	Sleeve 2 Screw 2

* Specifications are subject to change without notice.



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