
TOA ENGINEERED SOUND PRODUCT

DIGITAL SOUND DELAY

D-1103



DESCRIPTION

The TOA D-1103 is a One-by-Three Digital Delay, designed for a wide variety of applications such as theaters, concert halls, houses of worship, auditoriums, large meeting rooms, arenas and stadiums.

Delay times range from 10 microseconds (1/8 inch) to 655 milliseconds (approx. 750feet). Ten-microsecond increments are maintained throughout the entire delay range, giving the D-1103 the ability to achieve the extended delay required by remote speaker/cluster locations and simultaneously to perform the microsecond delay required for component alignment.

The use of 16-bit, 100kHz analog-to-digital conversion allows the D-1103 to achieve superb audio quality, with dynamic range better than -90dB and THD below 0.03%. Delay information may be stored in four non-volatile preset memories, permitting instant set-ups. The preset memories can be accessed with front panel switches or remotely via contact closures. This permits simultaneous activation of several interconnected units, either externally or by means of a master D-1103 unit. A removable screw-terminal link sets the status of the D-1103 as a master or slave unit. A rear panel protect switch disables all front panel functions except level controls, to prevent tampering. A smoked

plastic security cover is included to restrict access to all front panel controls.

An automatic bypass function permits complete signal bypass of the unit in the event of an AC power loss. Terminal strip connections are used for electronically balanced inputs and outputs. High quality, low distortion input and output transformers with 30Hz— 20kHz response are optional and installation requires no soldering. A seven-segment multi-color LED level indicator assists in proper gain staging. AC line noise suppression is built in to ensure reliability, The D-1103 occupies one standard EIA rackspace.

FEATURES

1. Three signal delay outputs.
2. Adjustable 0— 655 millisecond delay in summed 10-microsecond and 10-millisecond steps.
3. Four storage memories for delay settings.
4. Remote preset-selection terminal strip.
5. Automatic bypass circuitry in case of AC power loss.
6. AC noise suppressor protection.
7. Protect switch disables front-panel pushbuttons.
8. Security cover supplied.
9. Optional input/output isolation transformers.

SPECIFICATIONS

PERFORMANCE:

Frequency Response	20Hz to 20KHz, ± 1 dB
Total Harmonic Distortion	Less than 0.03%
Hum and Noise	At least 90dB below maximum output
Delay	
Time	0 to 655 msec
Steps	10 μ sec & 1 msec scales (summed)
Propagation Delay	100 μ sec
A/D Conversion	16-bit at 100kHz Sampling Rate
Memories	Four-selectable via front panel buttons or rear panel dry contact to screw terminals. One master controls up to 15 slave units.

INPUT & OUTPUT:

Input	
Type	Electronically balanced (Transformer optional)
Input Impedance	10k ohms
Rated Input Level	+ 4dB*
Maximum Input Level	+ 18dB*
Outputs (x3)	
Type	Electronically balanced (Transformer optional)
Recommended Load	600 ohms or higher
Rated Output	+ 4dB* at 600 ohms
Maximum Output Level	+ 18dB*

CONTROLS & PANEL FUNCTIONS:

(Front Panel)

Input Level Control	Attenuation type
Output Level Controls	x 3; Attenuation type
Level Meter	
Type	Headroom Indicator; 0" indicates 3dB below maximum level
LED Points	Seven segments (Red at 0 and -3dB; Green at -6, -9, -12, -16, and -26dB.)
Memory Selection	4 pushbuttons with LED status indicators
Fine	Fine/Coarse Display Pushbutton with LED status indicator
Lock	Disables function pushbuttons except memory selection and Fine" LED status indicator
Memory	Memory Store
Clear	Displayed Delay Time Clear
Setting	Up/Down Buttons (x 3)
Display	3-digit numeric display (x 3)
Power	On/off pushbutton with LED status indicator

(Rear Panel)

Protect	On/off slide switch; Disables all front panel pushbuttons
Input	Screw terminals (H=Hot, C=Cold, E=Ground)
outputs	x 3; Screw terminals (H=Hot, C=Cold, E=Ground)
Ground	Signal Ground to Chassis Ground (removable link)
Remote Selection	4-presets; Screw terminals; Selection via dry contacts to "E" Master designation by removal of "D/E" link
Fuse	250V 0.3A Slow-blow Type (120V version) 250V 0.1A Slow-blow Type (220V/240V version)
Power Socket	EIA AC power cable socket

POWER:

Power Requirements	AC mains, 50/60KHz
Power Consumption	15 watts

PHYSICAL:

Dimensions (W x H x D)	19.0 x 1.7 x 14.0 inches (483x 44 x 357mm) EIA Rack Mount
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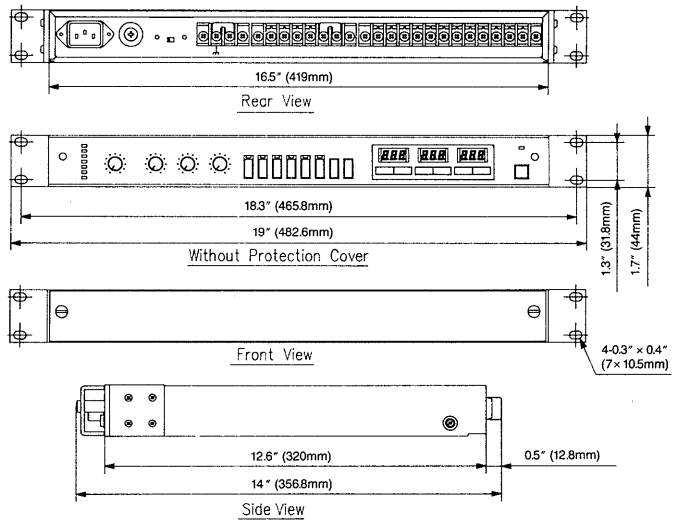
Net Weight	9.7 lbs. (4.4kg)
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OPTIONAL ACCESSORIES:	LT-101 Input Transformer LT-102 Output Transformer (one per output)
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Designed for UL Approval.

*0dB is referenced to 0.775V RMS, unless otherwise stated.

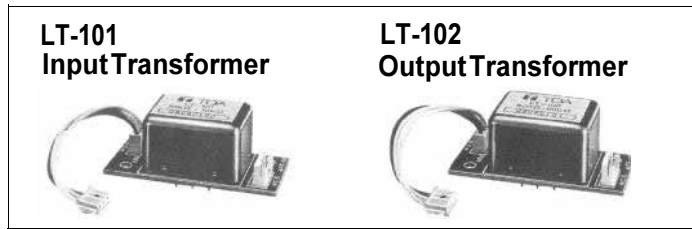
APPEARANCE AND DIMENSIONAL DIAGRAM



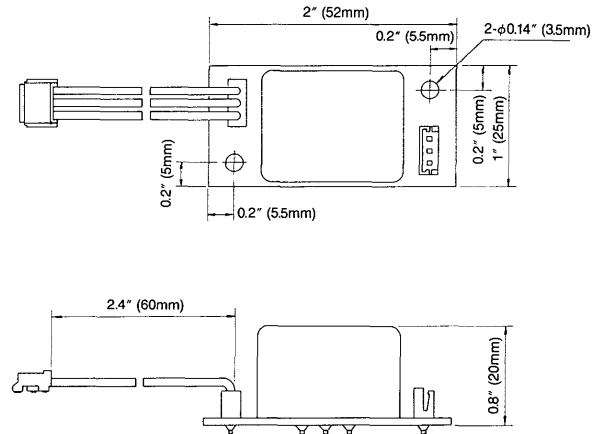
ARCHITECTS AND ENGINEERS SPECIFICATIONS

The digital signal delay device shall be capable of delaying an audio input signal to each of three independently adjustable outputs. The minimum output time setting shall be 100 microseconds, including propagation delay, and the time delay at each output shall be adjustable in 10-microsecond steps up to maximum delay of 655 milliseconds. The unit shall use 16-bit A-to-D conversion with a 100kHz sampling rate, and shall have a maximum output-to-noise ratio floor of greater than 90dB. The input circuitry shall be electronically balanced and shall accept either balanced or unbalanced sources. The balanced input impedance shall be 10k ohms. Each output circuit shall be electronically balanced and capable of driving a load of 600 ohms or greater. The unit shall accept optional input and output transformers which shall be internally installed via standoffs and plug-in connectors. A 7-segment LED input headroom display shall indicate 3dB below maximum output for the combination of input and input level control settings. Frequency response shall be flat (± 1 dB) from 20Hz to 20KHz. The digital delay device shall include a digital display that can be set to indicate the time delay of Outputs "1", "2" and "3". A front panel "Fine" control shall allow the user to set the output delay for output "1", "2" or "3" in summed high resolution (1 O-microsecond step) or low resolution (1 -millisecond step) modes. A "Lock" mode shall be provided which disables all front panel pushbuttons except the memory selection and "Fine" keys. A back panel "Protect" switch shall disable all front panel pushbuttons, leaving only input and output level controls functional. A security cover shall be provided to protect the front panel controls from being tampered with. The delay unit shall provide four preset memories for storage of delay-time settings. The preset memories shall be accessible via front panel pushbuttons or remotely by means of contact closures through a rear panel terminal strip. Up to 15 delay units shall be configurable, with a single master unit to initiate preset selection for all slave units. The unit shall contain a relay circuit which bypasses all internal electronics in the event of power failure. Input and output connections shall be made via rear panel terminal strip connectors. The unit shall measure 19.0" wide x 1.7" high x 14.0" deep (483 x 44 x 357mm) with rack mount ears attached and shall occupy one standard EIA rack space. AC noise suppression circuitry shall be built in to increase reliability. The unit shall be a TOA Model D-1103 Digital Signal Delay.

OPTIONAL MATCHING TRANSFORMERS



APPEARANCE AND DIMENSIONAL DIAGRAM LT-101/LT-102



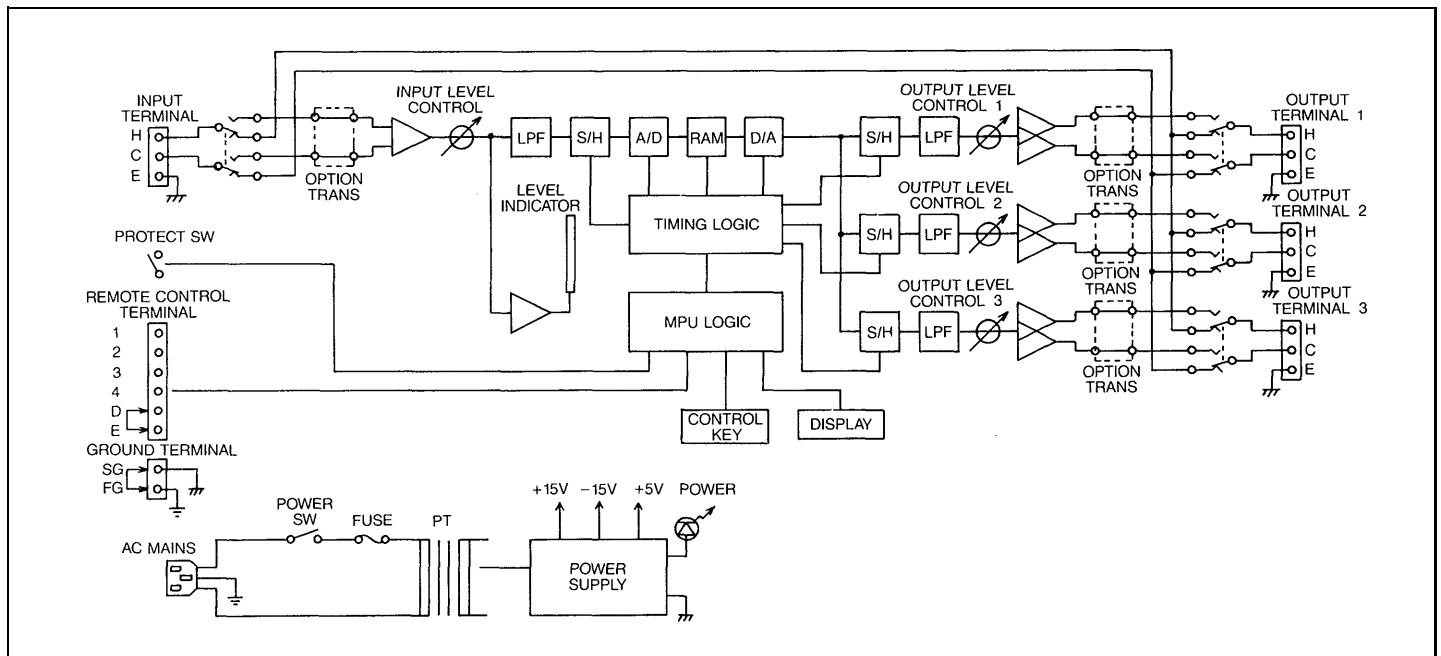
SPECIFICATIONS

Model No.	LT-101	LT-102
Impedance	10k ohms: 10k ohms	600 ohms: 600 ohms
Frequency Response	30Hz to 20kHz at ±0.15dB	
Distortion	Less than 0.2% (50Hz, 5dB*)	
Constant Loss	Within 15dB (at 1kHz, 1V)	
Weight	0.1 lbs. (44g)	
Accessories	Sleeve; 2, Screw; 4	

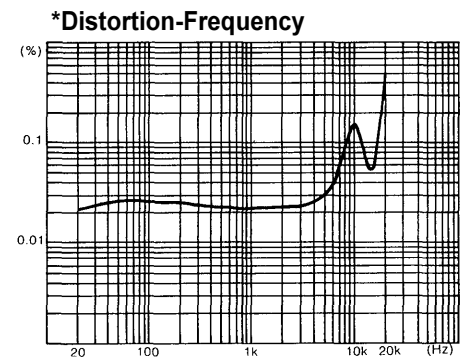
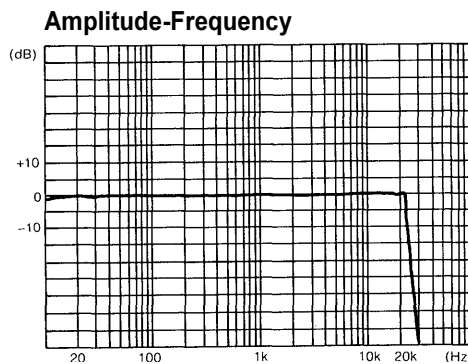
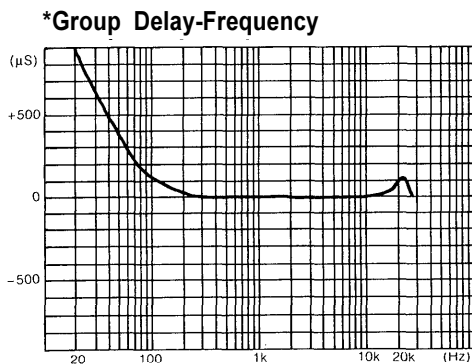
*0dB=0.775Vrms

**Each transformer mounts at predrilled chassis hole locations. Transformer connections are made via plug-in multi-pin connectors. No soldering is required.

BLOCK DIAGRAM



CHARACTERISTIC DIAGRAMS



**Specifications are subject to change without notice.

