

# 7510B

## AUTOMATIC MICROPHONE MIXER



### FEATURES:

Program-actuated inputs with automatic remote device switching

Automatic output level regulation and background noise discrimination

Expandable to 24 channels (1 mainframe) or 48 channels (2 linked mainframes)

4-channel quick-insert subassemblies include gold-plated, 12 pin plug-in input connectors

New high-stability UREI input and output modules

Front panel access allows in-rack operating and setup adjustments

frame installation and system hookup by the addition of control mounting subframes and inclusion of special 12 pin, four-channel input connectors. The new connectors are gas tight and gold plated for long life under variable environmental conditions but can be quickly removed for servicing. Each input assembly contains four new UREI microphone input modules designed for low distortion and long term reliability. The mainframe output module, also from UREI, is a new design featuring low noise and a +24 dBm output capability. All user controls are located on the front panel, while contractor setup and test controls are accessible through the front panel for quick in-rack adjustments.

A maximum of 24 program-actuated input channels may be simultaneously active on one 7510B main-

The compact, reliable JBL 7510B is derived from the industry standard 7510A and incorporates new features requested by contractors and consultants. Input assemblies have been redesigned for fast main-

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frame. Output level is automatically adjusted by the 7510B to provide a constant margin of gain before feedback, regardless of how many microphones are active. Each input channel can be independently switched to any of three modes: continuously actuated (manual), program-actuated (automatic), or priority override (automatic).

In the automatic mode, the level-sensing circuitry of the 7510B utilizes a zero-crossing detector and an ultra-fast digital switch to produce completely inaudible turn-on; there are no click or pops, and the beginnings of words or musical notes are not chopped off. The combination of program-actuated microphones and output level correction offers a constant gain margin below feedback, difficult to accomplish with a conventional mixer. Manual gain riding is never necessary.

The 7510B is a modular, rack-mountable unit with space for 6 plug-in input assemblies, each containing full electronics, controls, and connections for 4 balanced microphone inputs. The 7510B is supplied with 4 inputs installed. The front panel is fully labeled for the maximum of 24 input channels; unused input positions are covered by blank panels. The mainframe is fully wired, making it easy to install additional input assemblies at any time. Each input channel has a multi-function direct output 6.3 mm (1/4") phone jack, providing a normal through connection between the booster amplifier output and the summing buses. Insertion of a 6.3 mm (1/4") 3 conductor TRS phone plug into the jack breaks the normal through connection, and provides both a nominal +4 dBv unbalanced direct output and a nominal +4 dBv unbalanced input to the summing buses, suitable for feeding a signal to and receiving a signal from an external signal processor.

Each 7510-03 has a 15-pin remote control connector for providing external gain adjustment of 49 dB for the preamplifier stage of each of four balanced inputs. When the gain is properly adjusted, it provides the best combination of headroom versus noise between the low output of a dynamic microphone to the high output of a tape recorder. Each input, when activated, provides a contact closure to ground through a pin on the remote control connector. This may be used to control external logic circuitry, to switch speakers on and off, activate video cameras, turning on a logging tape recorder, etc., all by activating an associated input channel.

Other features of the 7510B include built-in 48 V phantom power with on/off switch for condenser microphones, an auxiliary input which can be used for line level signals such as tape recorders or a return for the direct outputs sent to a signal processor.

The auxiliary input may be wired either through the circuit in which the gain adjustment is made for the

number of open microphones (NOM) in which case its gain will be incremented according to the NOM formula, or it may be wired to a later circuit section, in which case its gain will remain constant irrespective of the number of active inputs. This is done by wiring the 3-conductor input plug tip-sleeve or ring-sleeve, and requires no internal modifications to the 7510B. The gain for each input is set manually, and the 7510B has a Master Gain control and VU meter for the output level. An auxiliary unbalanced output, suitable for driving a tape recorder is provided through a 1/4 inch phone jack on the rear panel.

Two 7510B Automatic Microphone Mixers may be connected together via the interface connector on the output assemblies. This connector ties together the circuits for program audio, NOM counting and background threshold to allow two mainframes to act as one larger unit with a maximum capacity of 48 MIC/LINE inputs. Full program audio is available at the outputs of both mixers.

The JBL Model 7510B is an ideal choice as the main mixer in private or public meeting rooms, courtrooms, houses of worship, restaurants, small clubs, and other similar installations. In addition, it is also an excellent tool for the sophisticated recording studio, theater, concert sound reinforcement, and broadcaster.

## TECHNICAL INFORMATION

Each input of the 7510B can be set for any of three operating modes: ON, in which the input functions as a conventional mixer; AUTOMATIC, in which the input is actuated by the presence of a program source; and PRIORITY, in which the input is also program-actuated, but will override other inputs set to AUTOMATIC mode.

The 7510B achieves its performance through a unique combination of digital and analog circuitry. In the program-actuated modes, digital logic circuits compare those sounds present at all microphones (background noise) with those originating from a specific microphone (program). The threshold for discrimination between background noise and program is adjustable by means of a front-panel control. This threshold may be relative, varying with the ambient sound level, or fixed. The attack time is dependent on how soon a zero crossing occurs after the signal first exceeds the threshold level; it corresponds to a half-cycle from 20 Hz-20 kHz. Because rise time is just 30 to 60 ns and occurs within the half-cycle of detection, and turn-on is effected while zero output voltage is present, input actuation is totally inaudible. Even the sharpest musical transient is accommodated. Release time is continuously adjustable from 100 ms to 5s.

When an input channel is actuated, it not only feeds an audio (analog) signal to the audio mixing bus and summing amp, it also feeds a digital signal to the digital mixing bus and summing amp. The digital summing amp keeps track of how many input channels are active from moment to moment; it feeds this information to an 8 bit digital attenuator, which is programmed to reduce the gain by 3 dB for each doubling of the number of active input channels. The actual gain reduction is logarithmically scaled and is incremented for each additional live input channel to provide a constant system level, reducing the possibility of feedback as the number of active microphones increases.

## SPECIFICATIONS:

<b>Maximum Gain:</b>	
Input Module:	Adjustable, 15 dB to 64 dB (600 ohm load) Adjustable, 21 dB to 70 dB (10K ohm load)
Output Module:	7 dB (600 ohm or higher load)
Overall System:	77 dB (600 ohm or higher load)
<b>Main Output Characteristics:</b>	
Actual Impedance:	Less than 40 ohms 20 Hz to 20 kHz
Load Impedance:	For 600 ohm or higher loads
Maximum Output Level:	+24 dBm
<b>Direct Output Characteristics:</b>	
Actual Impedance:	600 ohm unbalanced
Load Impedance:	For 600 ohm or higher loads
Maximum Output Level:	+14 dBm (600 ohm load) +20 dBu (10K ohm load)
<b>Input Characteristics:</b>	
Actual Impedance:	Greater than 10K ohm (20 Hz to 20 kHz unbalanced)
Source Impedance:	0 ohm to 600 ohm
Nominal Input Level:	Adjustable, 2.5 mV RMS (-50 dBu) to 0.7 V RMS (-1 dBu)
Input Overload:	Adjustable, 45 mV RMS (-25 dBu) to 6.13 V RMS (+18 dBu)
<b>Aux Input Characteristics:</b>	
Actual Impedance:	10K ohm ( $\pm 5\%$ ) unbalanced
Source Impedance:	0 ohm to 10K ohm
Nominal Input Level:	+4 dBu typical
Input Overload:	7.75 V RMS (+20 dBu)
<b>Frequency Response:</b>	
Input Module:	+0, -0.5 dB 20 Hz to 20 kHz
Output Module:	+0, -0.5 dB 20 Hz to 20 kHz
Overall System:	+0, -0.5 dB 20 Hz to 20 kHz
<b>Total Harmonic Distortion:</b>	
Input to Direct Output:	0.02% maximum 20 Hz to 20 kHz at +20 dBu
Input to Main Output:	0.02% maximum 20 Hz to 20 kHz at +24 dBm
Equivalent Input Noise:	-130 dBu (0 dBu RE, 0.775 V RMS, 50 ohm source)
<b>Automatic Mix Function:</b>	
Input Attack Time:	10 ms to 10 $\mu$ s (1/2 waveform from 20 Hz to 20 kHz after signal exceeds set threshold)
Input Rise Time:	30-60 ns (tolerance for turn-on once attack occurs)
Input Release Time:	100 ms to 5 seconds, adjustable
Channel Attenuation:	25 dB

## SPECIALIZED APPLICATIONS

The 7510B is an ideal mixer for any situation requiring multiple microphones with differing demands on each. For instance, in a meeting room, the chairperson's microphone can be set on PRIORITY mode, allowing him or her to override any other speaker. In a house of worship, it will prevent excess ambient noise (which causes the sound to have a "hollow" quality) from getting into the sound system.

The 7510B can also be used as a very fast, high-quality noise gate. This has particular application in the recording studio, where it can improve the clarity from closely placed, multi-mic set-ups, and in concert sound reinforcement, where it can increase the overall system gain before feedback.

All of the 7510B's functions are automatic. It requires no attention and no manual gain riding once it has been adjusted, freeing the sound technician for other concerns.

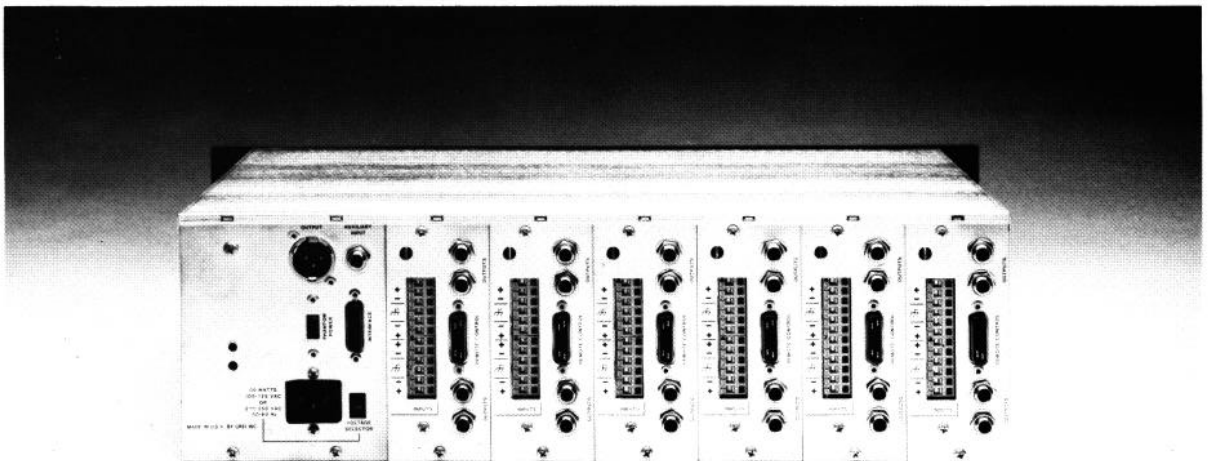
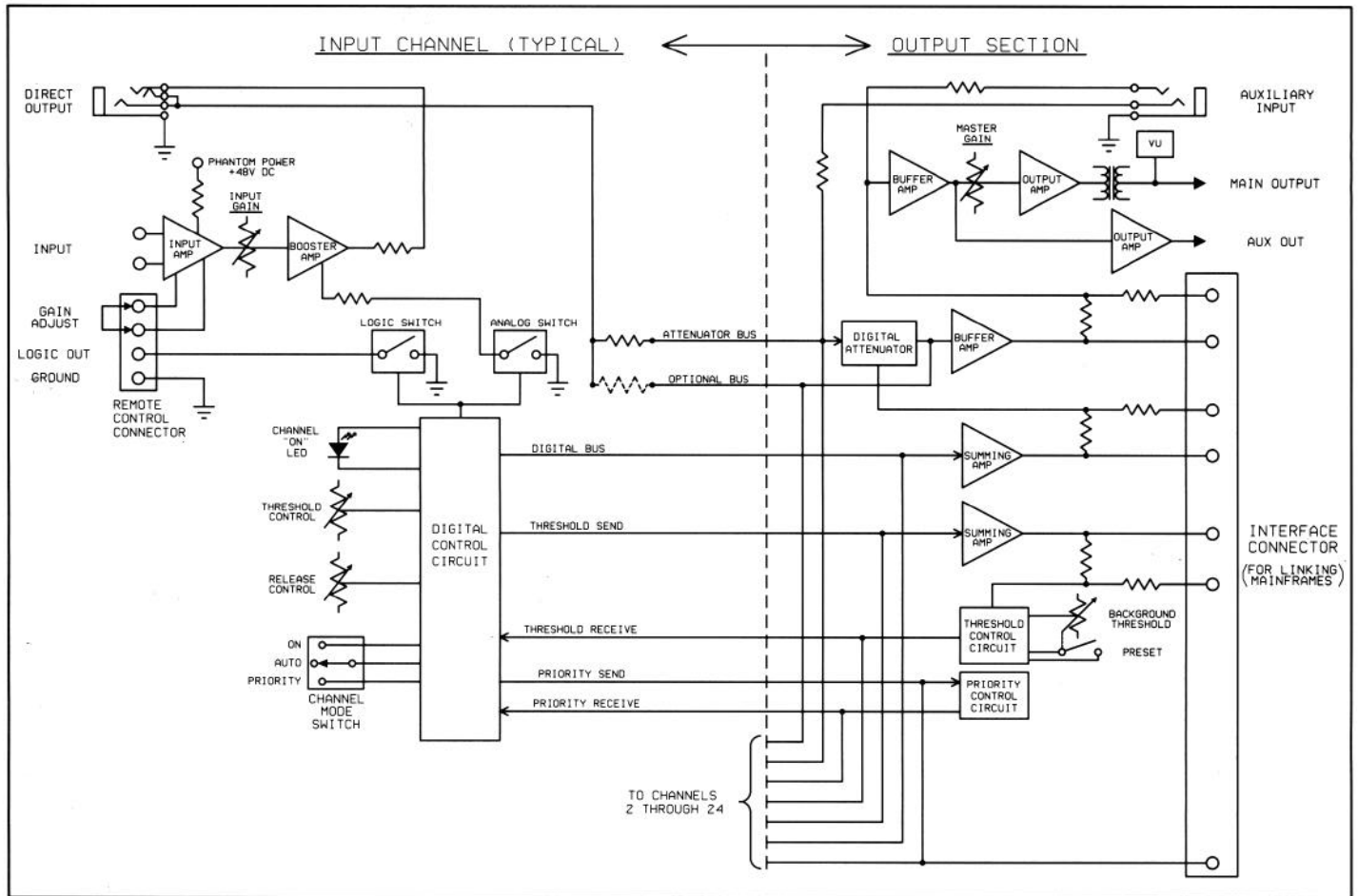
<b>Feedback Prevention:</b> 3 dB for each doubling of inputs	
<b>Controls:</b>	
Channel Gain:	Audio taper potentiometer
Master Gain:	Audio taper potentiometer
Channel Threshold:	Screw-adjustable linear taper potentiometer
Background Threshold:	Audio taper potentiometer with CCW switch
Release Time:	Screw-adjustable linear taper potentiometer
Mode Switch:	3 position toggle switch
Power Switch:	Push ON/ Push OFF
Phantom Power Switch:	Slide Switch
Voltage Selector Switch:	Slide Switch
<b>Indicators:</b>	
Channel ON:	Red LED
Power ON:	Green LED
Output Level:	VU meter: 0 VU = +4 dBm output
Power Supply:	115 volts AC switchable to 230 volts AC, $\pm 10\%$ , 50/60 Hz—Internal fuse protection
<b>Connectors:</b>	
Direct Output:	1/4 inch phone jack; mating connector—Switchcraft 267 (3 conductor, tip-ring-sleeve)
Main Output:	3 Pin XLR type; mating connector—Neutrik MC3FC or Switchcraft A3F
Remote Control:	15 pin female panel socket; mating connector—AMP 205735-6 or TRW DA-15 P
Interface:	15 pin female panel socket; mating connector—AMP 205735-6 or TRW DA-15 P
Dimensions:	133 mm high x 483 mm wide x 283 mm deep, (5 1/4 in. high x 19 in. wide x 11 1/8 in. deep)
<b>Weight:</b>	
Mainframe with 1 input Assembly (4 channels) and Output Assembly:	Net 6.4 kg (14 lb.)
1 input Assembly (4 channels):	Net 0.6 kg (1 lb, 3 oz)
1 output Assembly:	Net 1.5 kg (3 lb, 4 oz)
Mounting:	Occupies 3 EIA standard rack spaces
Panel Finish:	Black Anodized Aluminum with white nomenclature
Accessories:	7510-03 Expansion Assembly (4 inputs) SC7 Security Cover

NOTE: 0 dBu = 0.775 V  
0 dBm = 1 mW in 600 ohms

JBL/UREI continually engages in research related to product improvement. New materials, production methods, and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL/UREI product may differ in some respect from its published description, but will always equal or exceed the original design specifications unless otherwise stated.

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7510B Automatic Microphone Mixer Signal Flow/Block Diagram.



Rear Panel

