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# Professional Series Model 7510 Automatic Microphone Mixer

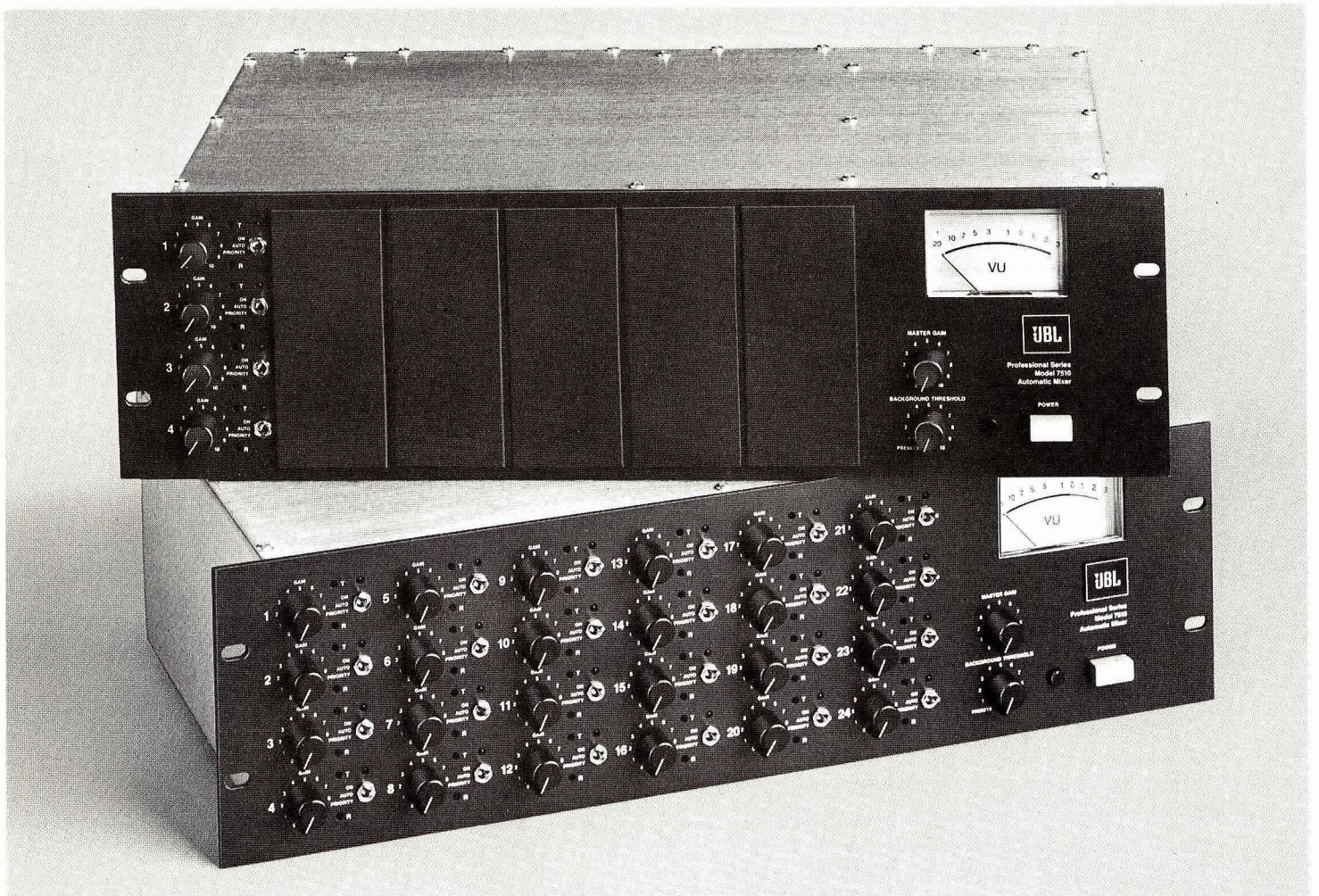
Program-actuated inputs

Automatic control of output level

Automatic background noise discrimination

Expandable to 24 input channels

+15 dBm output at less than 0.2% THD



JBL

The JBL 7510 is a compact microphone mixer that provides up to 24 program-actuated input channels. Output level is automatically adjusted to provide a constant feedback margin regardless of how many microphones are active. Each input channel can be switched to a continuously actuated mode, an automatic, program-actuated mode, or an automatic override mode.

In the automatic modes, the level-sensing circuitry of the 7510 utilizes a zero-crossing detector and an ultra-fast rise time to produce completely inaudible turn-on; there are no clicks 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 margin against feedback, difficult to accomplish with a conventional mixer or a compressor/limiter. Manual gain riding is never necessary.

The 7510 is a modular, rack-mountable unit with space for 6 plug-in modules, each containing full electronics, controls, and connections for 4 balanced microphone inputs. The 7510 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 modules at any time. The monophonic output section includes a large VU meter, a Master Gain control, and a balanced +4 dBv output with a male XL-type connector. Each input channel has an unbalanced direct output suitable for feeding an external signal processor.

Other features of the 7510 include built-in 48 VDC phantom power for capacitor microphones, and an auxiliary input which can be used as a return for any direct output(s) sent to a signal processor. The gain for each input is set manually.

The JBL Model 7510 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 7510 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 inputs in the Automatic mode.

The 7510 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 is relative, varying with the ambient sound level.

When the digital logic senses that a program is present, it actuates that input. 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 5 s.

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 microphone channels are live from moment to moment; it feeds this information to an 8-bit microprocessor, which is programmed to reduce the gain of the audio amplifier by 3 dB for each doubling of the number of live microphones. The actual gain reduction is logarithmically scaled and is incremented for each additional live mic to provide a constant system level, reducing the possibility of feedback as the number of live microphones increases.

The 7510 offers significant advantages over a compressor/limiter. When set to prevent system feedback, such components reduce output gain in response to input level increases, whether those increases result from the activation of additional microphones or increased level from one microphone. Compressor/limiters thus affect program dynamics to an unnatural degree. Compressors also increase output gain when input level is reduced, resulting in audible "breathing" as the background noise level increases. The 7510 turns off unused microphones, so there is no increase in background noise.

### **Specialized Applications**

The 7510 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 7510 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 setups, and in concert sound reinforcement, where it can increase the overall system gain before feedback.

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

## Specifications

### Maximum Gain

Input Module	65 dB minimum (600 $\Omega$ load); 71 db minimum (10 k $\Omega$ load)
Output Module	9 dB minimum (600 $\Omega$ load); 12 dB minimum (10 k $\Omega$ load)
Overall System	80 dB minimum (600 $\Omega$ load); 83 dB minimum (10 k $\Omega$ load)

### Main Output Characteristics

Actual Impedance	360 $\Omega$ at 1 kHz, transformer isolated (floating)
Load Impedance	For 600 $\Omega$ or higher loads
Maximum Output Level	+24 dB minimum (ref. 600 $\Omega$ )

### Direct Output Characteristics

Actual Impedance	600 $\Omega$ , unbalanced
Load Impedance	For 600 $\Omega$ or higher loads
Maximum Output Level	+15 dBm minimum (ref. 600 $\Omega$ )

### Mic Input Characteristics

Actual Impedance	1.35 k $\Omega$ typical at 1 kHz, transformer balanced
Source Impedance	For 150 $\Omega$ microphones
Nominal Input Level	2.5 mV RMS minimum (-50 dBv)
Input Overload	45 mV RMS minimum (-25 dBv)

### Aux Input Characteristics

Actual Impedance	10 k $\Omega$ , $\pm$ 5%, unbalanced
Nominal Input Level	+4 dBv (1.23 V RMS) typical
Input Overload	11 V RMS minimum

### Frequency Response

Input Modules	20 Hz-20 kHz, +0, -1 dB
Output Modules	20 Hz-20 kHz, +0, -1 dB
Overall System	20 Hz-20 kHz, +0, -1 dB

### Total Harmonic Distortion

Mic In to Direct Out	0.2% maximum, 35 Hz-20 kHz
Mic In to Main Out	0.2% maximum, 35 Hz-20 kHz

### Equivalent Input Noise

-130 dBv minimum (20 Hz-20 kHz, 0 dBv ref. 0.775 V RMS, 150  $\Omega$  source)

### Automatic Mix Functions

Input Attack Time	10 ms to 10 $\mu$ s ( $\frac{1}{2}$ waveform from 20 Hz to 20 kHz after signal exceeds set threshold)
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Input Rise Time	30-60 ns typical (tolerance for turn-on once attack occurs)
Input Release Time	100 ms to 5 s, adjustable, typical
Channel Attenuation	26 dB $\pm$ 1 dB, adjustable
Feedback Prevention	3 dB typical for each doubling of inputs

### Controls

Channel Gain	Audio taper potentiometer
Master Gain	Audio taper potentiometer
Channel Threshold	Screw-adjustable linear taper potentiometer
Background Threshold Release Time	Audio taper potentiometer
Mode Switch	3-position toggle switch
Power Switch	Push ON/Push OFF

### Indicators

Channel On	Red LED
Power On	Green lamp
Output Level	VU meter; 0 VU = +4 dBv output

### Phantom Power

### Power Supply

48 V DC typical on mic inputs  
100-120 V AC, 50/60 Hz, 0.5 A fuse;  
Other mains voltages available outside the U.S.A.

### Connectors

Mic Inputs	D3F (female 3-pin panel socket)
Main Output	D3M (male 3-pin panel socket)
Direct Outputs	6.3 mm ( $\frac{1}{4}$ in) phone jacks (3-circuit)
Aux Input	6.3 mm ( $\frac{1}{4}$ in) phone jack (3-circuit)

### Dimensions

133 mm x 483 mm x 292 mm deep  
5 $\frac{1}{4}$  in x 19 in x 11 $\frac{1}{2}$  in deep

### Weight

Mainframe & 1 Input Module (4 Channels)	Net, 6.1 kg (13 $\frac{1}{4}$ lb) Shipping, 6.9 kg (15 $\frac{1}{2}$ lb)
1 Input Module Alone	Net, 0.7 kg (1 $\frac{1}{2}$ lb) Shipping, 0.9 kg (2 lb)

### Mounting

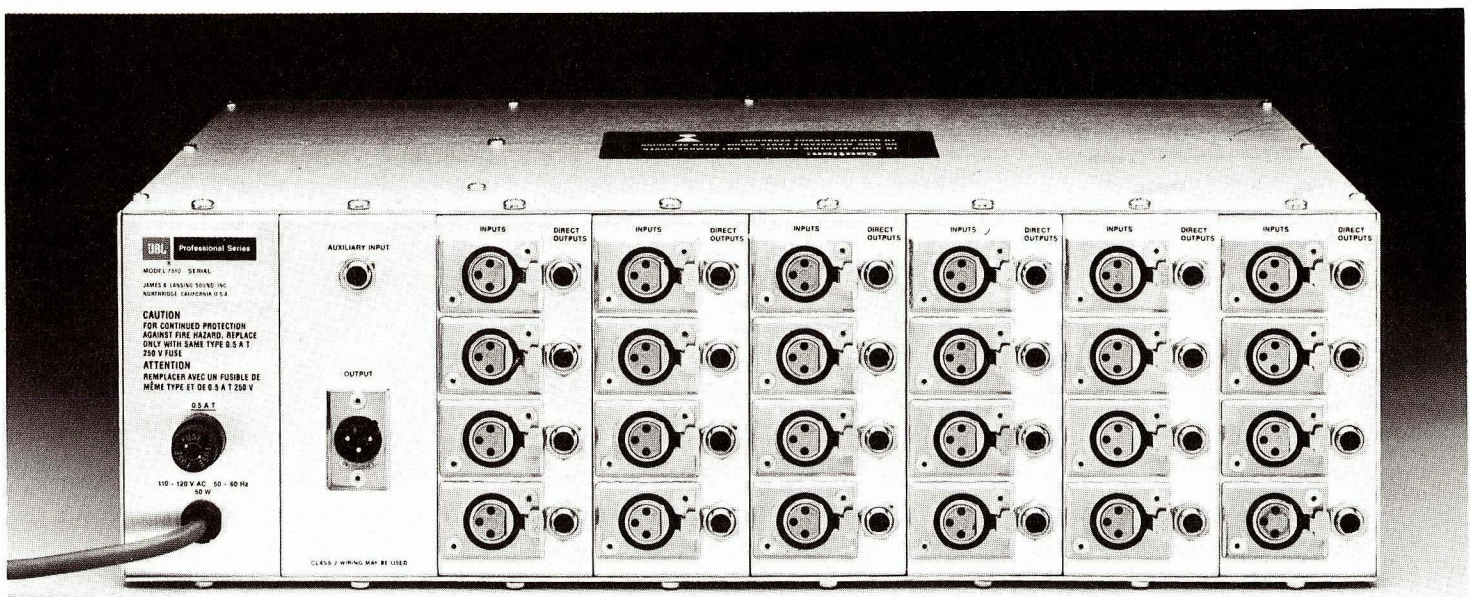
Occupies 3 standard EIA rack spaces

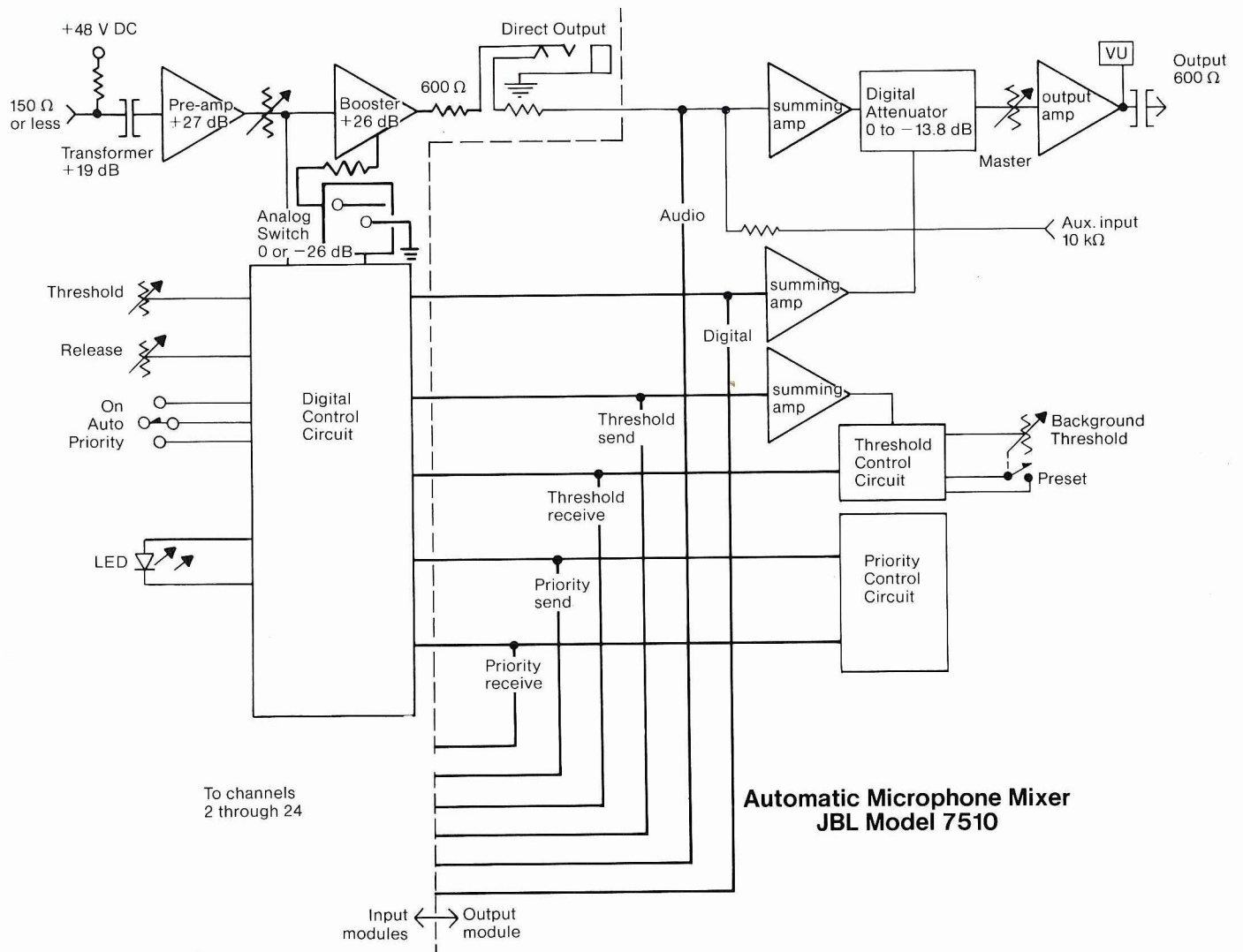
### Panel Finish

Semi-gloss baked enamel, dark gray; white nomenclature

NOTE: All dBv ref. 0.775 V

Rear panel view of the 7510.





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JBL Model 7510**

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