SPATIALIZER®
AUDIO LABORATORIES

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SPATIALIZER®
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RETRO™

OWNER'S MANUAL

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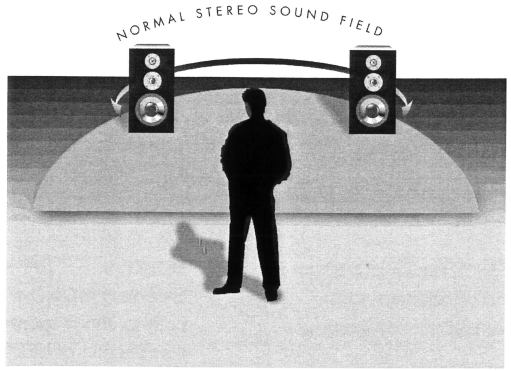
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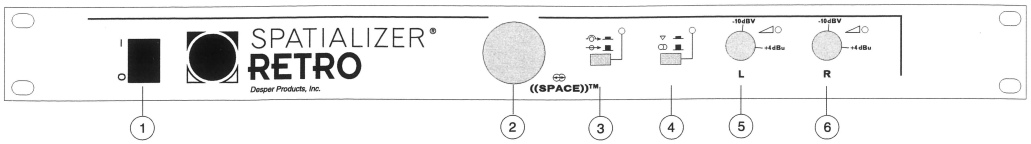
INTRODUCTION



Spatializer® Retro™ is a tool that expands the art of audio engineering and provides the artist with a larger sonic canvas. *Spatializer Retro* achieves this by 'retrofitting' your existing console and converting its panpots into 3-D stereo positioning controls that can place sounds outside your speakers and around you in a 270° arc.

This state-of-the-art technology converts your studio into a Three Dimensional Audio Workstation, enabling you to create bigger mixes with more room for individual instruments. *Spatializer* technology is mono-compatible and is used by top engineers on award-winning albums.





FONT PANEL

1. **POWER SWITCH** I O
   Turns power on and off, indicated by illumination of green output LEDs.

2. **((SPACE))**
   Adjusts the amount of Spatializer processing, which increases as the ((SPACE)) control is turned clockwise. There is no processing in the completely counter-clockwise or "0"position.

3. **BYPASS**
   Selecting BYPASS enables a hardwire bypass of the Spatializer processing circuit. Illumination of LED indicates BYPASS has been activated.

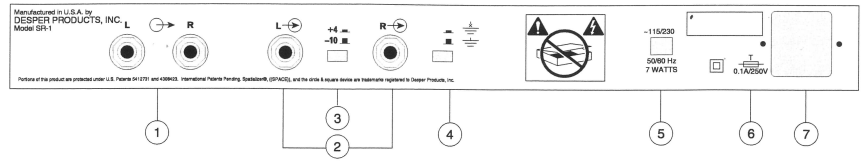
   THROUGH
   Selecting THROUGH passes the incoming signal to the Spatializer circuits.

4. **MONO**
   Selecting MONO sums the left and right out puts to check for mono compatibility. Illumination of LED indicates activation of MONO switch.

   STEREO
   Sends a stereo signal to the outputs.

5. **LEFT OUTPUT ATTENUATOR**
   Trims left output level to match console's operating levels (-10 dBu or +4 dBv). When there is a signal present, the LED indicator is green.The LED indicator turns red to indicate clipping.

6. **RIGHT OUTPUT ATTENUATOR**
   Trims right output level to match console's operating levels (-10 dBu or +4 dBv). When there is a signal present, the LED indicator is green.The LED indicator turns red to indicate clipping.



BACK PANEL

1. OUTPUTS
   TRS 1/4" phone jacks are supplied for balanced or unbalanced use.

2. INPUTS
   TRS 1/4" phone jacks are supplied for balanced or unbalanced use.

3. INPUT LEVEL SELECTOR
   Trims input level to match console's operating level (-10 dBu or +4 dBv).

4. GROUND LIFT
   Depressing this switch disconnects the input shields from the ground.

   GROUND
   In this position, the input shields are connected to the ground.

5. VOLTAGE SELECTOR SWITCH

6. FUSE

7. IEC ELECTRICAL RECEPTICAL

UNPACKING AND INSTALLATION

Your *Spatializer Retro* was carefully packed at the factory in special packaging designed to protect the unit from rough handling and shipping. However, we strongly urge you to examine the packaging and its contents for signs of physical damage which may have occurred in transit.

If the unit is damaged, please do not return it to us, but notify your dealer and the shipping company immediately to insure claims for damage and/or replacement are granted.

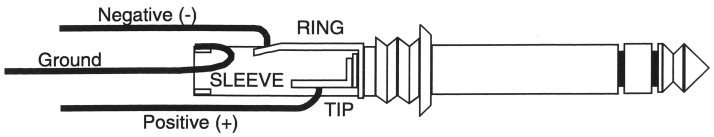
Spatializer Retro is designed to fit into one standard rack space (1 ¾"). We recommend that you allow an additional 4" of depth for the connectors on the rear panel. *Spatializer Retro* includes a special high-performance, low-heat power supply, but to protect the unit from overheating, provide adequate ventilation and do not place the *Spatializer Retro* on high-temperature devices such as power amplifiers.

INSTALLATION

CONNECTIONS

Spatializer Retro has been carefully designed to integrate seamlessly into almost any audio path through 1/4" jacks. *Spatializer Retro* operates in either a **balanced** or **unbalanced** configuration.

BALANCED (tip-ring-sleeve) operation uses a two-conductor shielded cable, where each of the two center conductors carries the signal but of opposite phase. They have equal but inverted potential differences from that of ground. Balanced cables must be configured so that tip carries the positive signal, sleeve is connected to ground and ring carries the negative signal. Balanced cables have STEREO jack plugs (two stripes).



UNBALANCED (tip-sleeve) operation uses a single-conductor shielded cable, with the center conductor carrying the signal and the shield at ground. Unbalanced cables (standard guitar cables, for example) have MONO jack plugs (one stripe).



Generally, you'll want to use balanced connections when possible, especially If the signal feeding the Spatializer Retro is from a balanced jack. Balanced connections are cleaner and quieter, especially when used with long cable runs.

IMPEDANCES

Note: This section only applies to a small number of users.

The input has an impedance of 42kΩ and can be driven by most input sources. If a device's output requires a load of 600Ω (provided with most output transformers), a 600Ω resistor should be tied across the tip and ring on the input connector.

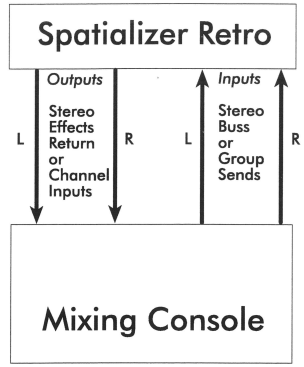
As standard, the output of the Spatializer Retro is electronically balanced and has an output impedance of 100Ω. When driving transformer coupled loads, it may be necessary to create a 500Ω source impedance. For this purpose, install two 250Ω resistors (tolerance 1%) in series with tip and ring on the output connectors.

SET-UP AND OPERATION

You can connect the Spatializer Retro to any type of mixing console, using one of the following patching options.

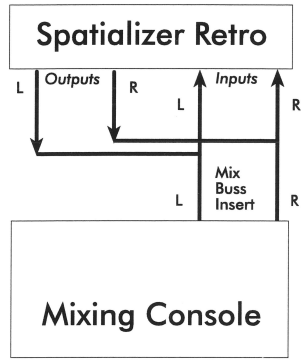
OPTION 1:

If your mixing console has stereo busses or group sends, connect them to Spatializer Retro's left and right inputs. Then connect Spatializer Retro's left and right outputs to any stereo effects return or available channel inputs.



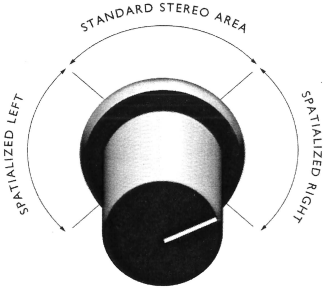
Assign channels desiring Spatializer processing to the stereo group or buss connected to Spatializer Retro's inputs. Make sure channels assigned to Spatializer Retro are not assigned to the mix buss as well.

Use the panpots on the console to place the sound anywhere in the Spatialized Sound Field. There is no need to assign channels you do not wish to Spatialize to the stereo group or buss connected to Spatializer Retro's inputs.



OPTION 2:

If your mixing console does <u>not</u> have stereo busses or group sends, but has inserts on the mix buss, connect Spatializer Retro at the mix insert point. In this configuration, all of the console's panpots will be Spatialized. Use the panpots on the console to place the sound anywhere in the Spatialized Sound Field. If you do not wish to Spatialize certain channels, pan sounds according to the panpot illustration in Figure 1.

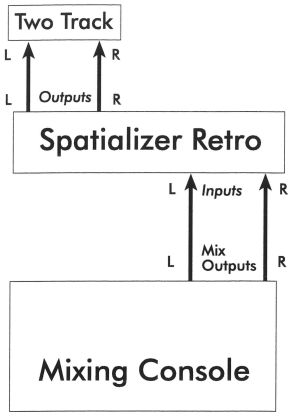


PANPOT
Figure 1

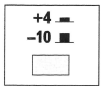
Option 3:

If your mixing console does not have stereo busses, group sends, or mix inserts, connect the console's mix outputs to the *Spatializer Retro's* left and right inputs. Then connect Spatializer Retro's left and right outputs to the power amp inputs or two track recorder inputs.

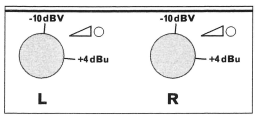
Use the panpots on the console to adjust the sound's placement in the Spatialized Stereo Sound Field. If you do not wish to Spatialize certain channels, pan sounds according to the panpot illustration Figure 1 on the previous page.



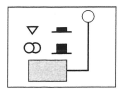
The following is a step by step procedure for setting up the *Spatializer Retro* after it has been patched into a recording or live sound system.



1. Set the input attenuation switch on the rear panel of *Spatializer Retro* to match your console's rated output level (-10 dBu or +4 dBv). Check your console manual for this information.

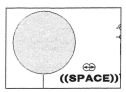


2. Set the output attenuation knobs on the front panel of the *Spatializer Retro* to match the input attenuation selected (-10 dBu or +4 dBv) on rear panel.



3. If possible, send a 1kHz tone through *Spatializer Retro* when adjusting the output attentuation controls to make sure left and right output levels are equal. If you don't have a tone generator, use a synthesizer, test tone compact disc, or any audio source with a constant level.

Note: Make sure *Spatializer Retro* is not in BYPASS mode when doing this procedure. Turn the ((SPACE)) knob to its minimum (fully counter-clockwise) position.



4. When finished, deactivate BYPASS and turn the ((SPACE)) knob to the 12 o'clock position. (This is only a suggested setting.) Turning the ((SPACE)) knob clockwise provides more *Spatializer* processing.

SETTING THE ((SPACE)) CONTROL

The ((SPACE)) knob is the single most important control on the *Spatializer Retro*. Most users will find a single "best" setting and leave the knob there. To find that "best" setting, connect the *Spatializer Retro* to your console as indicated in the previous section. Using the console's panpots, pan a mono signal to the extreme right with the ((SPACE)) control set at the minimum (full counter-clockwise) value. Sit in the center listening position of your monitor system and slowly advance the ((SPACE)) control until the sound you have panned to the right appears to move beyond the right speaker. Turning the ((SPACE)) control beyond the point of maximum apparent shift will decrease mono-compatibility, without providing more effect. The *Spatializer Retro* has been engineered so that setting the ((SPACE)) control at 12 o'clock will provide optimum results in most situations.

FREQUENCY RANGES

Spatializer Retro primarily creates its effect by manipulating the frequencies between 400Hz and 5kHz. Adjustment of equalization within this bandwidth can enhance the Spatializer Retro's performance.**Note:** Hot spots are 500Hz and 2kHz.

MONO COMPATIBILITY

Spatializer Retro has been carefully engineered to provide mono-compatible mixes in all but a small handful of situations. However, the user should always check mono-compatibility by using the MONO button on the *Spatializer Retro* or the mixing console. If the mix doesn't seem to be mono compatible, boosting frequencies between 400Hz and 5kHz with an equalizer often solves the problem.

Another alternative is ghosting. Mono compatibility can be restored by mixing a low-level duplicate of the original signal into a mono-compatible region of the mix. When the mix is heard in stereo, the processed signal is audible and the full effect will be heard. When the mix is heard in mono, the duplicate signal will support the original signal.

ENHANCING THE SPATIALIZER EFFECT

The key to creating a bigger 3-D effect is to create a greater difference in the input signal. For stereo sounds, this difference can be a timing difference (delay one side a little or manipulate the phase), a frequency-based difference (EQ one side differently than the other), or an amplitude-based difference (change the relative volumes of the signal's sides). For mono sounds, split the sound into two channels of your mixer and apply the above techniques to one of the channels, then hard-pan them left and right and feed them both into the *Spatializer Retro.*

ENHANCING EXISTING EFFECTS

Spatializer Retro can create dramatic results when used with your existing effects. Reverbs will wrap around the listener, as if they were actually inside the room, hall, or space. Generally, less reverb is needed to create a deep, rich ambience. Choruses, flangers, and other stereo time-based effects will swirl around the listener's head. Stereo delays can bounce around the listener. Distortion effects like tube emulators and guitar stomp boxes often greatly enhance midrange frequencies around 500Hz. These frequencies are most affected by *Spatializer* processing, and thus, when distortion effects are fed into *Spatializer Retro*, up to 350˚ performance can be achieved.

APPLICATION NOTES

PULLING SOUNDS TOWARD THE LISTENER

You must have a stereo input to achieve the following effect. Split the left channel and feed it to two panpots. Split the right channel and feed it to two panpots as well. One pair of left and right panpots are sent through the *Spatializer Retro*.The output of the *Spatializer Retro* is now combined with the signal from the other pair of panpots.

In a typical application, an instrument is panned via the Retro-processed panpots to appear as though it is coming from beyond the right speaker. Simultaneously, the left non-processed signal of the same instrument is panned left and level-adjusted so that it appears to come towards the listener.

MIXES

Spatializer Retro can be applied to an entire stereo mix to create a wider, more open 3-D stereo sound field.

AUTOMATION THROUGH MIDI

Mixing boards which feature MIDI-controlled panpots will, by extension, provide MIDI controlled 3-D mixes.

SPECIFICATIONS

System Gain	Trimmable to 0dB for balanced or unbalanced output
Frequency Response	+0.5dB 22Hz to 22kHz
Total Dynamic Range	90dB
Total Harmonic Distortion (THD)	Less than 0.001% 20Hz to 2kHz Less than 0.003% 2kHz to 20kHz
Input Impedance	42kΩ (balanced)
Input Level	Maximum with input attenuator set to +4dBv +29dBu (balanced); +23dBu (unbalanced) Maximum with input attenuator set to -10dBu +15dBu (balanced);+ 9dBu (unbalanced)
Output Level	+23dBu (balanced); +21dBu (unbalanced)
Headroom	Inputs +25dBu (balanced);+19dBu (unbalanced) Outputs +30dBu (with input attenuator set to -10 dBu) +18dBu (with input attenuator set to +4 dBv)
Output Impedance	100Ω (balanced); 50Ω (unbalanced)
Recommended Load Impedance	600Ω or greater
Connectors	1/4" phone TRS (tip [hot], ring [cold], sleeve [ground])
Indicators, Switches & Controls	Power On; ((SPACE)) Control; Mono Switch; Bypass Switch; Overload L/R Controls
Power Requirements	120/240 VAC/7 watts
Fuse	.4 fast blow
Ground Lift	Allows disconnect of the input shields from ground
Physical Dimensions	EIA 1U rackmount 1.75"H x 19"W x 6"D
Weight	5 lb/ 2.3Kg
Operating Temperature	-40C to +85C