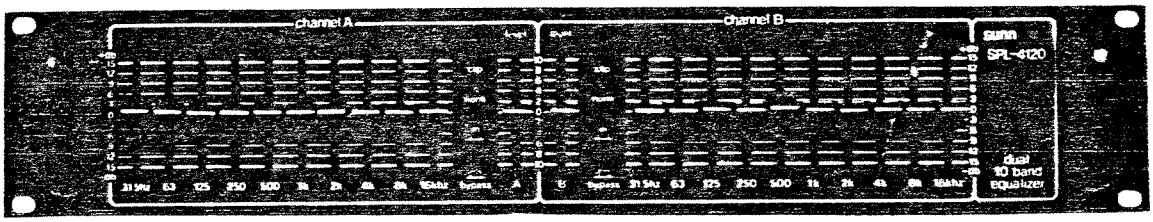
SUNN SPL-4120

dual 10 band equalizer

operating manual



The SUNN SPL 4120 is an advanced solid state equalizer containing features which can be appreciated by the professional musician as well as the discriminating audiophile. Low noise, low distortion, high slew rate devices have been used throughout the SPL 4120 to insure state-of-the-art performance. 15 db cut and boost is provided at ten octave intervals with an overall level control capable of a full ± 20 db. Level sensing is employed at two critical nodes in the circuit to provide distortion free performance while maintaining an excellent signal to noise ratio. All inputs and outputs allow balanced or unbalanced line operation to insure compatability and flexibility. These features are all contained in a rack mountable steel chassis to provide you with a rugged, high performance audio tool that will fulfill your equalization requirements for years to come.

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FUNCTIONAL DESCRIPTION

The equalizer, as with all audio equipment, requires a thorough understanding of the functional blocks within the unit in order to make full use of its features. A diagram is provided on the back of the SPL 4120 as a handy reference. The following is a discussion of these blocks which make up the SPL 4120.

INPUT AND OUTPUT CIRCUITS

The input and output amps are basically buffer amplifiers which interface the equalizer with the outside world. The input amp accepts balanced signals and rejects any common mode noise. The LEVEL control varies the input amp gain from -20 db to +20 db. Use this control to compensate for any gain change which may have occurred due to filter control settings. The output amp converts the signal back to a balanced format but also compensates for unbalanced signals so that both types receive the same amount of gain from the SPL 4120. Note that in the BYPASS mode, the entire equalizer is bypassed. This allows you to turn the SPL 4120 on and off with no pops while in the bypass mode. Level matching is easier with this type of switching as opposed to the more common method of switching within the equalizer circuitry.

FILTER CIRCUITS

The filter circuitry is where the frequency response alterations take place. Each filter control varies the gain of the equalizer over a band of frequencies known as an octave. The filters have been optimized for accuracy and ease of front panel adjustment to insure that you will be able to obtain the frequency response you want with a minimum of trial and error. It is wise to use these controls sparingly since the filters are the combining type and can produce gains of 27 db if several adjacent bands are boosted. Extreme control settings will result in loss of headroom and should not be used except as special effects.

LEVEL SENSING CIRCUIT

The level sensing circuitry is designed to allow the user to make full use of the dynamic range available in the SPL 4120. The circuit measures the peak voltage at two critical points in the circuit and displays the highest of the two. The NORM light is triggered at 1 VRMS and the CLIP light is triggered at 8 VRMS. The signal level should be adjusted, either externally or by using the channel level control, so that the NORM LED remains on during most musical passages. The CLIP LED should only light during occasional musical peaks, if at all. Improper adjustment of signal level will cause loss of signal to noise ratio or signal distortion.

UNPACKING

The SUNN SPL 4120 graphic equalizer has been packed in a protective container. Keep this packing carton and the protective foam end supports for any future shipping needs. After unpacking this unit, check it for any damage that may have occurred during shipping. If any damage to this unit is found, you must notify the dealer immediately. Only the dealer may initiate a claim with the carrier for shipping damage. Be sure to save the packing container as evidence of damage for the carrier's inspection.

INSTALLATION

The SPL 4120 has been designed to allow the option of rack mounting. These units will fit any E.I.A. standard 19" rack and can be installed with four #10x32x1/2" machine screws. It's best to install this unit while the rack is lying on its back.

SUNN provides a full line of portable E.I.A. standard racks and accessories. These racks can be used with any standard rack mount equipment.

ACOUSTIC FEEDBACK AND ROOM EQUALIZATION

Acoustic feedback in a sound system is caused by an interaction between the speakers and microphones. There will always be a certain amount of signal received by the microphone due to the speakers. The amount of signal the microphones pick up will depend upon the room acoustics, the frequency response of the microphones and speakers and the mic and speaker placement. If the received signal is amplified enough (due to the mixer and power amplifier gain) it will cause the speakers to continue to produce the signal, and the characteristic howl of acoustic feedback will begin. This feedback will occur at a frequency which receives the largest amount of gain from the sound system. If the signal can be attenuated at that frequency, more gain can be added to the rest of the signal frequencies before feedback occurs. This is the role of an equalizer in a sound system.

TYPICAL PROCEDURE FOR ROOM EQUALIZATION

1. Set up your entire sound system the way it will be used. Include all equipment and adjust it the way you would normally use it. If feedback occurs during set up, reduce the gain of the mixer master level control(s).

2. Set the controls on the SPL 4120 to the flat position indicated by 0db on the front panel.

3. Slowly increase the mixer's master level until the sound system is on the threshold of feedback. A ringing sound will occur when you tap on the microphones.

4. Slowly attenuate the control which has the greatest effect on reducing the ringing. This will take some trial and error but usually will occur between 1K hz and 4K hz . Continue until the ringing has stopped.

5. Again, slowly increase the mixer's master volume level control until feedback begins. Adjust the equalizer to remove the feedback. Continue this procedure until you have achieved sufficient gain for your application or until the equalizer becomes ineffective at removing the ringing. (It is best to back off the gain at least 3db once maximum gain before feedback has been established). Repeat the entire procedure again if another equalizer is employed in another channel such as a stereo system or monitor system.

EQUALIZATION - OTHER - APPLICATIONS

The SPL 4120 can be a very useful instrument in applications other than feedback suppression. Due to the acoustics of a room and the speakers used, it's not uncommon to find that the tone coloration one wishes to produce cannot be achieved with normal preamp tone controls. The cut and boost capabilities of each frequency band allow the user to achieve a wide range of tonal coloration. Experiment with different tone settings to find the sound you are looking for. Level compensation may be necessary and this can be done using the level control.

In recording, the SPL 4120 can increase or decrease the presence of vocals and musical instruments by bringing out or reducing harmonics of the signals. The equalizer can be used on each channel or a multi-track recording as well as the entire mix to create the specific sound you have in mind. The BYPASS switch is handy for comparison of the equalized signal to the unequalized signal.

As an effects unit, the SPL 4120 can be used in conjunction with a musical instrument amplifier to provide a wide range of sounds. When connected between the preamp (s) and power amp it allows for a full range of tonal coloration to enhance the sound of the instrument.

INPUT CONNECTIONS

Both input channels in the SPL 4120 have one three pin audio connector (Cannon type) and one stereo phone jack that will accept either a balanced or unbalanced input signal. Do not use more than one input per channel at a time.

OUTPUT CONNECTIONS

Each output channel in the SPL 4120 has a three pin audio connector for balanced line operation and a phone jack for unbalanced operation. Use the correct output jack to match the line patching scheme in your sound system.

To avoid loss or distortion of signal, low impedance loads should not be used (Balanced; below 600 ohms, unbalanced; below 2K ohms). Do not use more than one output per channel at a time.

BALANCED AND UNBALANCED LINES

There are two basic methods of patching line level signals between PA components, (mixers, EQ's, power amplifiers, etc.), in sound systems, balanced and unbalanced lines. As the length of patch cables increase, so does the chance of introducing noise from external sources into your system (AC hum, dimmer buzz, CB etc.). The use of balanced lines help to remove the noise from these outside sources through common mode rejection. For this reason SUNN recommends that all patching in your sound system be done with balanced lines using two conductor shielded cable. This does not include patching between a power amplifier and speakers where two conductor speaker wire should be used. Balanced lines should be used only when both the input and output jacks of the units being connected together are designed for balanced lines. Do not connect the balanced output on the SPL 4120 to an unbalanced input.

If your system is not capable of balanced line patching and unbalanced lines are required, keep all patching cables to a minimum length. Keep all patching cables away from all AC power cords, lighting cables and speaker wires. Use single conductor shielded cable for unbalanced line patching.

OPERATING HINTS AND PRECAUTIONS

1. Avoid using this unit where it will be exposed to moisture (rain, drinks, etc).

2. To reduce the chances of introducing unwanted noise into your system, keep all patch cables away from AC power cords, lighting cables and speaker wire. Always use shielded cables for patching to and from this unit.

3. Make all signal connections before turning on this unit.

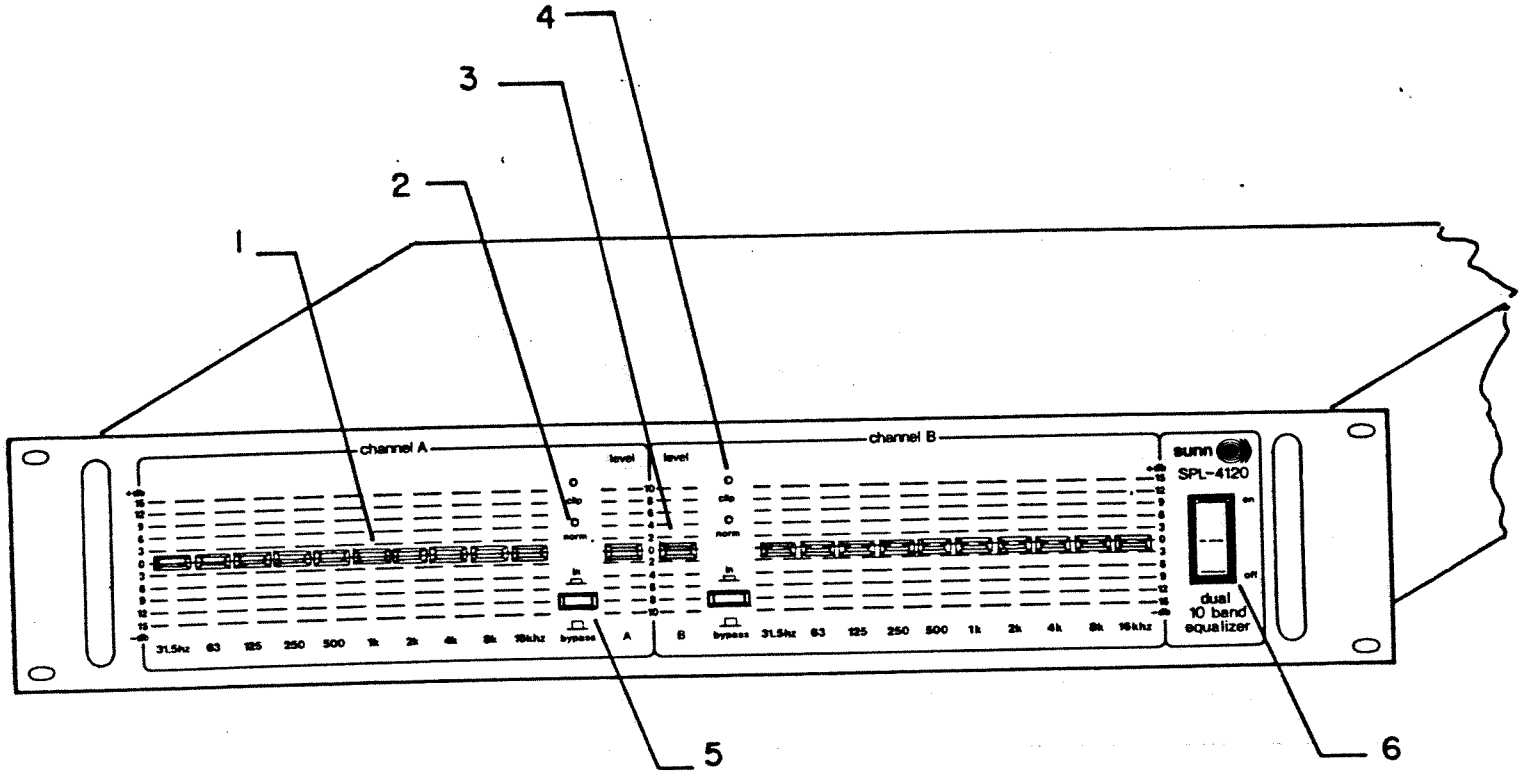
4. Set the BYPASS switch in the bypass position before turning the unit on and off. This will prevent any turn on and off transients from getting into your system. Make sure to switch the equalizer IN before using.

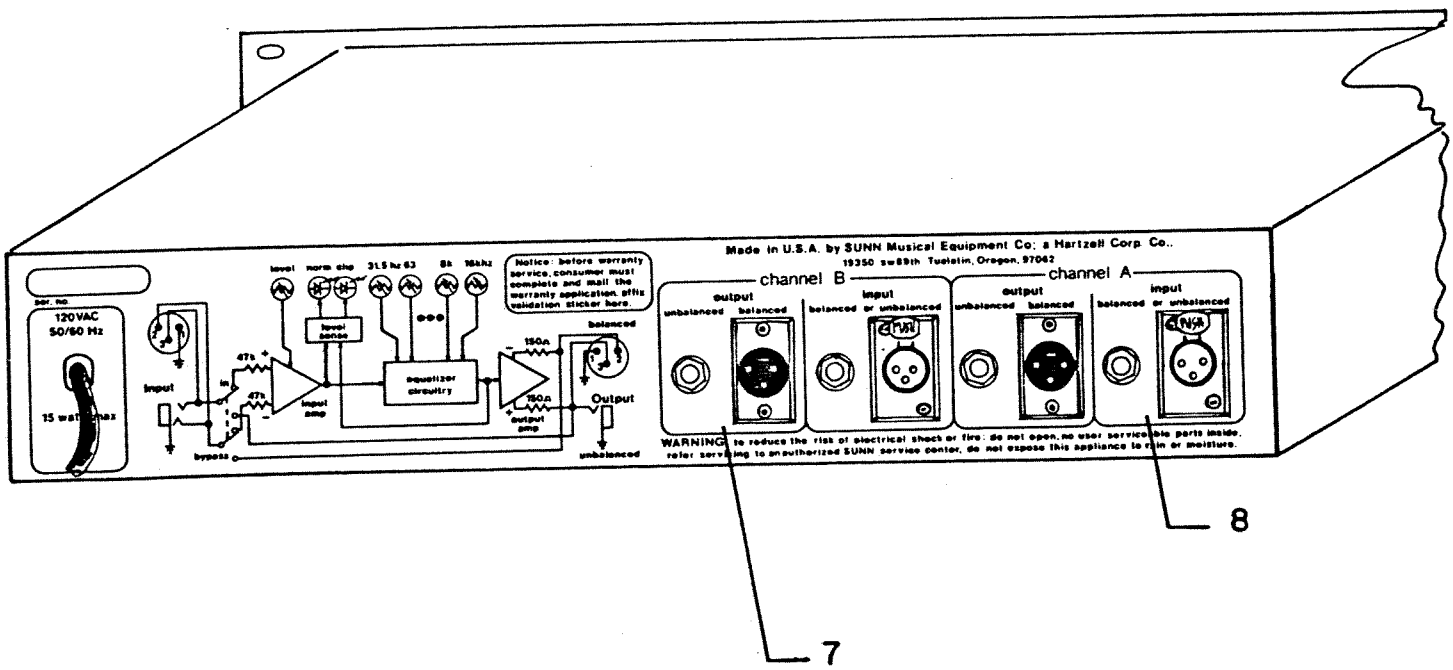
5. Do not overdrive this unit (indicated by lighting of the red CLIP indicator LED). This will cause unwanted signal distortion and may cause clipping in audio equipment following this unit.

6. To avoid any loss of gain, do not use the balanced output to drive an unbalanced line.

7. This unit is equipped with a three prong AC plug for domestic use (US-Canada). In applications where a grounded AC outlet is not available, use a three prong to two prong adapter. Do not remove the ground prong.

After the sound system has been set up and equalized, adjust the channel level controls on the SPL 4120 so that the green NORM indicator LED remains on during most musical passages. The red CLIP indicator should not come on except for a momentary period during the loudest transients.


4
3
2
1
channel A
channel B
level
level
sunn
SPL-4120
on
off
dual
10 band
equalizer
31.5hz 63 125 250 500 1k 2k 4k 8k 16khz
bypass
A
B
5
6


Made in U.S.A. by SUNN Musical Equipment Co; a Hartzell Corp Co..
channel B
channel A
output
input
unbalanced
balanced
balanced or unbalanced
120VAC
50/60 Hz
Input
Output
bypass
unbalanced
balanced
WARNING
7
8

1. FILTER CONTROLS:
These controls set the cut or boost response of each octave filter. The front panel is marked in steps of 3db for accurate adjustment. Because these filters combine however, the front panel markings are not accurate when two or more adjacent filters are adjusted. They can always be used as relative guides for repeating previous equalization curves.

2. NORM LED INDICATOR:
The green NORM LED will light when the signals in the SPL 4120 reach 1 Vrms (0dBv). Use this LED in conjunction with the LEVEL control to establish a proper signal level which will maximize signal to noise ratio and still avoid clipping.

3. LEVEL CONTROL:
This control will attenuate or boost the input signal. Use this control to set proper signal levels or to match the level of the equalized signal with the unequalized signal.

4. CLIP LED INDICATOR:
The red CLIP LED is used to visually indicate clipping distortion and will light when the internal signal level reaches 9 Vrms (19 dBV). Every piece of electrical equipment has a limit to the signal level it can produce. The CLIP LED lights when the SPL 4120 has reached that limit.

5. BYPASS SWITCH:
In the BYPASS (out) position, the input signal is routed directly to the output jacks-bypassing the internal electronics of the SPL 4120. In the IN position the equalizer is set up for normal operation.

6. POWER SWITCH:
This switch controls the AC power to the SPL 4120. The switch lights in the ON position to indicate that the equalizer is receiving power.

7. OUTPUT JACKS:
Both balanced and unbalanced output signals are available on SPL 4120. The phone jack is for use with unbalanced lines and the 3 pin connector is for use with balanced lines. The pin connections are as follows: Pin 1 = ground, Pin 2 = inverted signal, Pin 3 = non-inverted signal (same on input jacks).

8. INPUT JACKS:
Both input jacks will accept balanced or unbalanced signals. A stereo phone plug must be used to connect balanced signals to the phone jack.

SPECIFICATIONS
SPL 4120

All specifications refer to balanced or unbalanced operation unless noted

FREQUENCY RESPONSE:		20 hz to 20K hz +0, - .5db 2 hz to 200K hz +0, - 3db
DISTORTION:		THD - less than .05% IMD - less than .03% Measurements achieved with all controls in center position 20 hz to 20K hz at any output level.
SIGNAL TO NOISE RATIO: ANSI A WTD	Balanced	-92db from 1 VRMS output -112db from 10 VRMS output
	Unbalanced	-89 db from 1 VRMS output -107 from 8 VRMS output
SLEW RATE:		6 volts per microsecond unbalanced 9 volts per microsecond balanced
COMMON MODE REJECTION RATIO:		-50db @ 20K hz (balanced inputs) -70db @ 1K hz (balanced inputs)
MAXIMUM INPUT LEVEL:		10 VRMS
MAXIMUM OUTPUT LEVEL:	Balanced Unbalanced	10 VRMS into 600 ohm. 8 VRMS into 2K ohm.
GAIN:		Unity ± 1db all controls centered
LEVEL CONTROL RANGE:		± 20db
FILTER CENTER FREQUENCIES:		31.5, 63, 125, 250, 500, 1K, 2K, 4K, 8K, 16K hz.
FILTER ACCURACY:		± 10% from ISO center frequency.
CONTROL RANGE:		± 15db accurate within ± 1db of front panel markings for one control.
POWER REQUIREMENTS:		110 - 130 VAC 60 hz (US-Canada)
DIMENSIONS:		Ht. 3.5", Width 19", Depth 5.6" Ht. 8.9cm, Width 48.3cm, Depth 14.2cm
WEIGHT:		7.75 lbs., 3.5 kg

SUNN MUSICAL EQUIPMENT COMPANY'S LIMITED WARRANTY

SUNN Musical Equipment Company warrants new products to be free from defective materials and workmanship for one year from date of purchase to the original owner when purchased from an AUTHORIZED SUNN DEALER according to the following conditions:

The purchaser is responsible for completing and mailing to SUNN, within 10 days of purchase, the warranty application enclosed with each product. Upon receipt of the warranty application, SUNN will issue a warranty validation sticker that must be affixed to the product. Where a warranty validation area has not been provided on a few SUNN products, the validation sticker is to be affixed to your original proof of purchase and presented at the time of warranty service. PROOF OF PURCHASE ON UNREGISTERED EQUIPMENT IS NOT SUFFICIENT FOR RECEIVING IN-WARRANTY SERVICE. In the event you do not receive your validation sticker within 60 days of mailing, you are to notify SUNN Musical Equipment Company in writing immediately. The purchaser has the sole responsibility of completing and mailing the warranty application.

Light bulbs and meters carry a 90 day warranty from date of purchase.

SUNN products that have been subject to accident, alterations, abuse, rental, or defacing of the serial number are not covered by this warranty. Loudspeakers and drivers misuse due to overpowering or improper installation resulting in torn, burned or charred components will not be covered by this warranty.

The normal wear and tear of appearance items such as handles, corners, casters, and knobs are not covered under this warranty.

If your SUNN product requires service during the warranty period, SUNN will repair or replace, at its option, defective materials provided you have identified yourself as the owner of the validated product to any SUNN authorized service center or contact SUNN for service assistance. Transportation charges to and from an authorized service center or factory for SUNN products and components to effect repairs shall be the responsibility of the owner. In the event a product is to be returned to SUNN for repairs, a written return authorization from SUNN must be obtained prior to shipping.

SUNN is not liable for any incidental or consequential damages resulting from any defect or failure of this instrument other than the repair of the SUNN product subject to the terms of this warranty. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty is expressly in lieu of all other agreements and warranties, expressed or implied except as may be otherwise required by law.

Thank you for choosing SUNN!