OWNERS MANUAL

SPL 7450 POWER AMPLIFIER

sunn

Sunn is a product line of FMIC

P/N 036741

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SPL7450 FEATURES

450 Watts per channel into 4 ohms

900 Watts into 8 ohms, mono bridge

High current design for reactive loud-speaker loads

Computer logic controlled short circuit protection with independent LED signal status indicators

Soft clipping and gracious overload characteristics

Silent delayed turn-on and turn-off

Triac "crowbar" loudspeaker protection

Forced air cooling with automatic 2 speed fan

Full input connector complement with TRS phone jacks and male and female XLR connectors

High current 5-way binding posts and phone jacks for speaker output

Rugged "road proof" 14 gauge steel chassis construction

Uniform gradient heat exchanger for high reliability

Three rack space high (5.25 inches) chassis

SPL7450
Two Channel Power Amplifier

Your new Sunn SPL7450 Power Amplifier is designed to provide you with years of trouble free service for both permanent and portable applications. Utilizing a unique proprietary cross coupled protection system, the SPL7450 can deliver more power into multiple loudspeakers than is possible with the more conventional approaches for VI, current limiting and load fuses. Other features also include silent delayed turn-on and off, Triac "crowbar" loudspeaker protection, full input/output connector complement, and a rugged "Road Proof" 14 gauge steel chassis construction. Designed for the most demanding professional applications, the SPL7450 delivers sound quality equal to the most esoteric and expensive HiFi amplifiers on the market today.

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Description of Features

I. FRONT PANEL

Signal LED Indicator
The green signal LED is a multifunction signal indicator that informs the operator as to whether or not the channel is in the active status. Upon turn on, the LED turns on after a several second timing cycle delay. The LED will turn off if either the short circuit protection circuitry is activated or if excessive heatsink temperature is reached. During short circuit conditions, or a load of too low an impedance, the circuitry will interrogate the load, turn off the power amplifier and automatically reset when the abnormal load is corrected. Thermal cycling times are somewhat longer, typically measuring in minutes rather than seconds. If for some reason a channel thermals off, the fan will be in the high speed mode of operation.

Peak LED Indicator
The red peak LED indicator illuminates when the output voltage of the amplifier reaches clipping (maximum output voltage.)The threshold for the peak indicator automatically adjusts for load impedance and supply voltage variations.

Input Level Controls
Two (2) 41-position attenuators control the amplifier's input sensitivity. Control settings can vary between zero attenuation or less (maximum clockwise rotation) and infinite loss (maximum counter-clockwise rotation). At the full clockwise rotation, a +4dBu input signal is required for rated output for two channel operation and -2dBu input signal for Mono Bridge operation. Each gain control is independent except for the Mono Bridge mode of operation where Channel A is the active control & Channel B is deleted. Refer to the **Amplifier Operation** section (page 5) for additional information on proper adjustment of the input level controls.

Power LED Indicator
This LED is illuminated when the amplifier is turned on and main voltage is present. If this indicator does not light when the power switch is turned on (and does not trip) then check the supply of AC power.

I. REAR PANEL

Output Connectors
Each channel is provided with a single 1/4" phone jack and a pair of five-way binding posts which will accommodate a single pair of dual banana plugs (multiple stacked banana plugs are not recommended as they tend to fall out), spade lugs or bare wire. If the speaker wire is teminated with spade lugs, make sure that the lugs are tin or gold plated brass or copper, not plated steel. Non linear contact resistance phenomena will degrade the sonic integrity of any amplifier at the speaker/amplifier interface. The channel A and channel B outputs are spaced on 0.75 inch centers so that one banana plug can be used for bridged operation.

During performance verification measurements, use the five-way binding posts only.

CAUTION:
Do not operate the amplifier in the two channel (stereo) mode with a load impedance of less than 4 ohms connected to either channel.

Do not operate the amplifer in the Bridged Mode with a load impedance of less than 8 ohms.

Mode Switch
This two-position switch selects either the normal stereo (or two-channel mono) or the Bridged (single-channel mono) mode. With the button in the "out" position the amplifier is configured for the normal two-channel mode of operation. The SPL7450 is designed so that both channels A and B are connected together internally so that patch cords are not required for two channel Mono operation. If separate inputs are supplied to both the channel A and channel B input Phone Jacks, each channel operates independently (see section on input connectors). In the two channel mode of operation, both input attenuators control their respective channels.

With the button in the "In" position, the amplifier is connected for the Bridged Mode of operation. In the Bridged Mode of operation, only the Channel A input connectors and Level Control are active. Speaker output is taken across the two red (positive) output terminals. The Channel A terminal is the positive output terminal and the Channel B terminal is the negative terminal for Bridged operation only.

CAUTION:
In the Bridged Mode of operation, the load floats and is NOT chassis ground referenced.

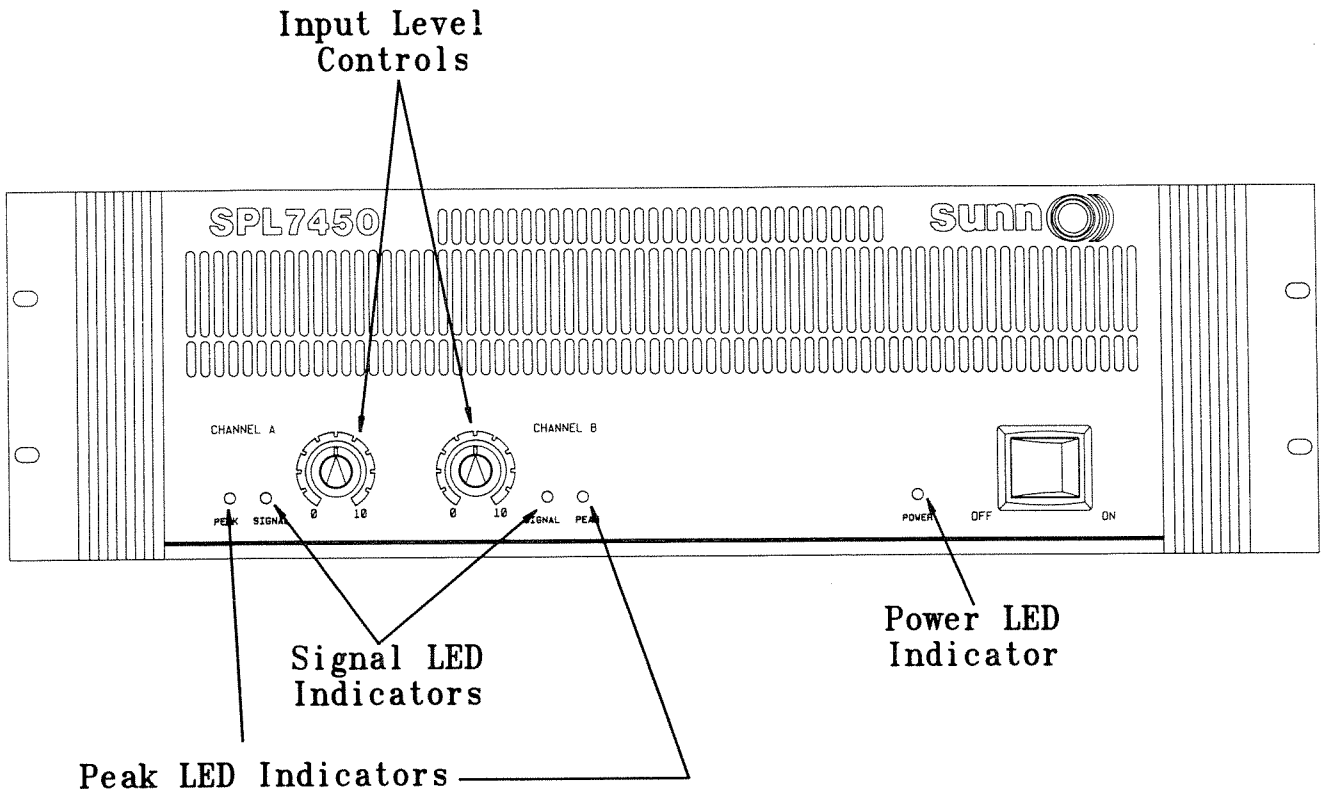
Input Connectors
Each channel is provded with a Female and Male XLR connectors for easy "Daisy Chain" operation of multiple channels in large systems, and a 1/4 inch tip-ring-sleeve (stereo) phone jack. Each input is electronically balanced and will accept signals from balanced sources (either active or transformer) or from unbalanced circuits. Pin #2 is the positive pin on the XLR connectors.

Note: When using the XLR connectors in Stereo operation, *it is necessary to insert an open circuit stereo (tip-ring-sleeve) phone plug in the Channel B 1/4 inch input jack.* This will disconnect the internal normal connection that combines the Channel A and Channel B inputs for two channel Mono operation.

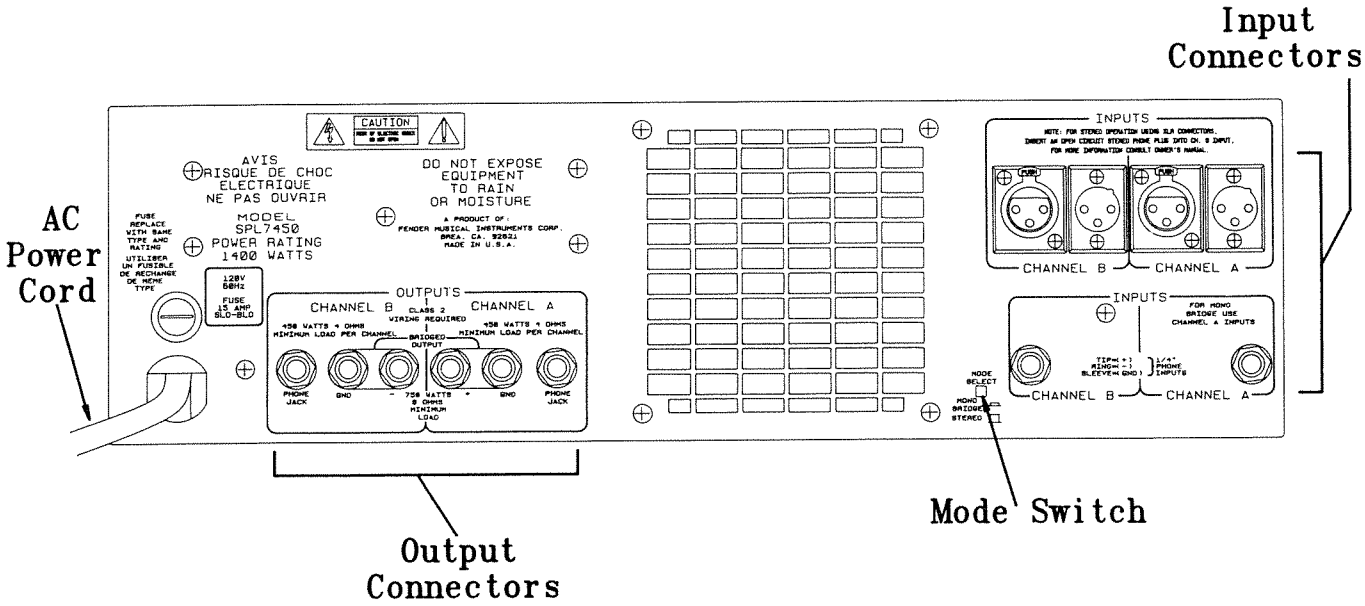
AC Power Cord
This must be connected to a source of 120V, 50 to 60Hz AC power with a current capability of at least 15 amps. Normal electrical code in the U.S. specifies a 20-amp limit on normal wall outlets. Therefore, each SPL7450 should be connected to an independent circuit if continuous full power operation is required.

As a general guideline it is acceptable to connect two (2) SPL7450 amplifiers to one (1) 20-ampere circuit provided the load is limited to 4-ohm loudspeakers on each channel and the signal source is full range music or speech. If you are going to heat up resistors with a sine wave you will need a separate 20-ampere circuit for each amplifier.

FRONT PANEL



REAR PANEL



Amplifier Operation

This procedure applies to stereo, mono, or bridged operation into a full-range loudspeaker system which uses a passive high-level crossover (or none at all). If you are using the SPL7450 in a multi-amplified system with an electronic or low-level passive crossover, the INPUT LEVEL controls on the amplifier are generally set to maximize (zero loss), and all level controlling is done at the crossover (skip step 10):

1. Turn all equipment OFF.
2. Plug the amplifier into a source of 120 volt, 50-60Hz AC power. Follow the precaution mentioned earlier in this manual about the current capability of the power circuit.
3. Connect the wiring from the signal source(s) to the amplifier's input jack(s).
4. Select the appropriate settings for the MODE switches.
5. Connect the speaker(s) to the output teminals, as appropriate for the setting of the MODE switch.
6. Adjust the INPUT LEVEL controls to their minimum (infinity) setting.
7. Turn everything else ON except the amplifier.
8. Adjust the controls on the signal source for "normal" indications on the source's meter or level indicator. If there is no metering, then set the master control at zero (minimum).
9. Turn the amplifier ON. After a short delay, the OPERATE indicator should illuminate.
10. Adjust the INPUT LEVEL control(s) to maximum. Carefully advance the master control on your signal source until the sound level from the speaker system is just past the "correct" level; i.e. just a little bit too loud. Remove the input signal from the source, leaving the master control (and any input controls on the source) set as they were. If the system is noisy (hissy), reduce the setting of the INPUT LEVEL control(s) by one "click" and repeat this step. You must "juggle" the settings of the source's controls and the amplifier's controls until you find a combination that gives you the desired amplifier output, freedom from clipping caused by excessive output demands placed on the signal source, and poor signal-to-noise performance caused by excessive amplifier gain.

Basic Connections and Wiring

Power and audio signal cables are the most common sources of sound system failure. Well-made and carefully maintained cabling is essential to the reliability of the whole system. If long speaker cables are required, make sure the wire is of sufficient size to transfer all the available amplifier power to the speakers rather than absorbing power itself. As a rule of thumb, the larger the wire, the better (larger wire has smaller "gauge number").

We have listed the smallest wires (the highest numbered gauges) recommended for best results. To make it simple, we'll assume you're operating under worst case conditions, with 4 ohm loads; 8 ohm operation will improve results with the same wire, and 2 ohm operation requires still heavier wire because the cable resistance is a higher percentage of the total load on the amplifier (see table below).

Large diameter (small gauge number) wire is expensive, and long cables made from it are heavy. Rather than running long speaker cables, it is better to locate power amplifiers near speakers and run a line-level signal cable over the long distance to the amplifier. This approach eliminates most of the signal loss due to speaker cable resistance so the speakers will be fed all the amplifier's power without the need for heavy cables. It can actually save money in many instances.

Always use stranded wire for three reasons:

(1) It is more flexible and less prone to metal-fatigue breakage.

(2) If an end is nicked while insulation is being stripped for connection, only one or two strands will break, not the entire wire, and

(3) There is some evidence, though disputed, that higher frequency audio signals flow along the outside of each conductor (skin effect); if this is so, the more strands, the lower the effective cable resistance to high frequencies.

In cases where speakers and power amplifiers are located far away from the signal source (be it a mixer or a preamp), "balanced line" signal cables are a wise choice.

CAUTION:
Never use coiled cords for speaker hookup, even in an emergency. Coiled guitar-type cords usually have higher internal resistance than the speakers themselves. This is due to the light-gauge wire used to keep the coil cords flexible. These cords will prevent most of the power from reaching the speakers. In high power operation, a coil cord can melt, cause a fire hazard, and possibly damage the amplifier. As a general rule, guitar-type connecting cords, both straight and coiled, make poor speaker cables.

The SPL7450 can produce enough power output to damage electronic equipment connected to its output. Besides being capable of destroying speakers, under certain circumstances shock and/or fire hazards are possible. High power amplifiers should always be properly maintained and used with care in clean and dry environments.

If you've mounted all your sound equipment in a rack or portable case, you can ensure that everything stays calibrated by marking the settlings of the necessary controls. Small pointers made from masking tape are visible in dim light, and can be removed with alcohol or rubber cement thinner without damage to the paint on most front panels, including those of the SUNN amplifiers. However, be sure to check the finish in an inconspicuous place to determine the suitability of any cleanser.

Assuming you're NOT turning all the equipment on at once with a switched power receptacle "strip," be sure to turn on the power amplifier last. This will prevent turn-on "thumps" from the mixer or other pieces of gear from possibly damaging speakers. The reverse logic should be used---turn OFF the amplifier FIRST--when shutting the system down.

The SPL7450 is timed to turn on the speaker outputs after the amplifier's power supply is fully charged up, thus preventing any turn-on noise. Timing of the amplifier's turn-on circuit is usually sufficient to accommodate all the turn-on anomalies from other pieces of gear in a system, making it acceptable to use a single switched power string in a permanent or semi-permanent system.

CAUTION:
The SPL7450 can draw a lot of AC power. Be sure the AC power source for your AC distribution system has adequate current capability to bear the entire load with an extra margin of safety. If you use a power strip with a built-in circuit breaker, make sure the breaker is rated for sufficient current to handle its load as well.

In multiple amplifier installations, we recommend sequential turn-on (either manually or via timed relays) to avoid a sudden, major drain on the AC line.

You should keep in mind that severe reduction of power line voltage affects the amount of power you can get FROM the amplifier. If you need to run long AC extension cords, make sure their conductors are as large as practical (small gauge number). Just as smaller diameter wire causes speaker line loss, smaller power lines cause loss. However, the effect of small AC lines is one of intermittent clipping under severe conditions.

Length* up to:	25 Feet	25 to 50 Feet	50 to 100 Feet
Minimum Wire Size:	#16 AWG	#14 AWG	#12 AWG

* Length of dual conductor cable (i.e. the 100-foot run specified here from amplifier to speaker represents a 200-foot round trip).

** Small diameter wire = high gauge #, large wire = low gauge#, AWG is an abbreviation for American Wire Gauge.

Specifications

OUTPUT POWER	
Stereo	Continuous sine wave output power, both channels driven, ±1dB 20Hz to 20kHz with 120VAC line voltage:
8 ohms	275 watts
4 ohms	450 watts
Mono Bridge	
16 ohms	550 watts
8 ohms	900 watts
Single channel	Driven @ 1 kHz, 1% THD:
8 ohms	330 watts
4 ohms	575 watts
2 ohms	875 watts
POWER BANDWIDTH	10 Hz to 50 kHz (3 dB down points from rated power at less than 0.1% THD)
FREQUENCY RESPONSE	+ 0- 3 dB; 5Hz to 50kHz (at rated power, 8 ohms)
RISE TIME	Less than 4.5*u*Sec
SLEW RATE	Greater than 20V/*u*Sec
TOTAL HARMONIC DISTORTION (THD)	20Hz to 20kHz at rated power
8 ohms	Less than 0.03% (30kHz Limit)
4 ohms	Less than 0.03% (30kHz Limit)
SMPTE INTERMODULATION DISTORTION (IMD)	60Hz and 7kHz; 4:1, at rated output power
8 ohms	Less than 0.05%
4 ohms	Less than 0.1%
TRANSIENT INTERMODULATION DISTORTION (TIM)	DIM 100
8 ohms	Less than 0.025%
4 ohms	Less than 0.05%
HUM & NOISE	Below rated output, 8 ohms
20Hz to 20kHz broad band	100dB
IHF A rated	105dB
DAMPING FACTOR	Ref., 8 ohms
5Hz to 20kHz	Greater than 50
1kHz	Greater than 400

INPUT IMPEDANCE	
Differential	20k ohms
CHANNEL SEPARATION	Below rated power, single channel operating
1 kHz	Greater than 80 dB
SENSITIVITY	Reference 1kHz, ±0.5dB
Stereo Mode, 8 ohms	+5dBu (1.34V)
Stereo Mode, 4 ohms	+4dBu (1.23V)
Bridged Mode, 8 ohms	-1dBu (0.690V)
Bridged Mode, 16 ohms	-2dBu (0.625V)
VOLTAGE GAIN	Reference 1kHz, ±0.5dB
Stereo Mode	30dBu (31.62V/V)
Bridged Mode	34dBu (63.24V/V)
STATUS INDICATORS	Each channel
Peak	LED (red)
Signal	LED (green)
Power	LED (green)
THERMAL PROTECTION	Independent LED indicates thermal shutdown
COOLING	Two speed fan
GAIN CONTROLS	41 position attenuator. One per channel
MODE SWITCHING	
Stereo-Mono Bridge	One push button switch
POWER REQUIREMENTS	120V, 50 to 60 Hz, 15 amps
WEIGHT	40 lbs.
DIMENSIONS	
Width	19 inches
Height	5-1/4 inches
Depth	14-7/8 inches (13-3/8 inches behind the front panel not including connectors)

NOTES

SUNN ELECTRONIC PRODUCTS LIMITED WARRANTY

This limited warranty against defects in material and workmanship applies only to the original purchaser when purchased from an Authorized SUNN Dealer. IMPORTANT: PLEASE RETAIN YOUR SALES RECEIPT AS IT IS YOUR PROOF OF PURCHASE COVERING YOUR LIMITED WARRANTY. THIS LIMITED WARRANTY IS VOID WITHOUT SUCH SALES RECEIPT.

Defective parts presented during the applicable warranty period with proof of purchase will be repaired or replaced without charge if the product is returned to any Authorized SUNN Dealer or SUNN Service Center. All SUNN Electronic Products carry a Three Year Limited Warranty from date of purchase, except that light bulbs, vacuum tubes and meters carry only a Ninety Day Warranty from date of purchase, and Speakers carry only a One Year Warranty from date of purchase. Any repair or service performed by any person or entity other than an Authorized SUNN Dealer or SUNN Service Center is not covered by this limited warranty. Transportation costs are not included in this limited warranty.

This limited warranty becomes void if the serial number on any product is defaced or removed, or the product has been damaged by alteration, misuse, rental, accident, or neglect; or the product has been repaired or serviced by persons not authorized by SUNN Musical Instruments Corporation. SUNN assumes no liability for property damage of any sort, whether to a SUNN product or any other property, which may result from the failure of any SUNN Electronic Product. Any warranties implied by law are limited to the duration of this express limited warranty. There are no warranties which extend beyond the description on the face hereof.

This limited warranty does not cover any SUNN lighting products or any parts or accessories to any such lighting products.

Some states do not allow limitations on how long an implied warranty lasts, so the above time limitations may not apply to you. Some states do not allow exclusions or limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Have service performed by any Authorized SUNN Dealer or contact:

Customer Relations
SUNN Musical Instruments
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