SM-900

USER GUIDE

SWR • CORONA, CA • USA

IMPORTANT SAFETY INSTRUCTIONS

CAUTION: TO REDUCE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER OR BACK.
NO USER-SERVICEABLE PARTS INSIDE. PLEASE REFER TO A QUALIFIED SERVICE TECHNICIAN.

A. Read Instructions: *All safety and operation instructions should be read before the product is operated.*

B. Retain Instructions: *The safety and operating instructions should be retained for future reference.*

C. Heed Warnings: *All of the warnings on this product and in the operating instructions should be adhered to.*

D. Follow Instructions: *All operating and use instructions should be followed.*

E. Cleaning: *Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a slightly damp cloth for cleaning.*

F. Water and Moisture: *Do not use this product near water; for example, near a swimming pool, wet basement, and the like.*

G. Accessories: *Do not place this product on an unstable cart, stand, tripod, bracket or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product.*

H. Ventilation: *Slots and openings in the unit are provided for ventilation and to ensure reliable operation of the product, to protect it from overheating, thus these openings must not be blocked or covered. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.*

I. Grounding: *This product is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.*

J. Power Cord Protection: *Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon them, paying particular attention to cords at plugs and the point where they exit the product.*

K. Lightning: *For added protection of this product during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the product due to lightning and power-line surges.*

L. Overloading: *Do not overload wall outlets or extension cords as this can result in a risk of fire or electric shock.*

M. Object and Liquid Entry: *Never push objects of any kind into this product through the openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.*

N. Servicing: *Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.*

O. Damage Requiring Service: *Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:*

1) When the power supply cord has been damaged
2) If liquid has been spilled or objects have fallen into the product
3) If the product has been exposed to rain, water, or other conductive liquids
4) If the product does not operate normally by following the operating instructions
5) If the product has been dropped or damaged in any way
6) When the product exhibits a distinct change in performance.

P. Replacement Parts: *When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.*

Q. Safety Check: *Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.*

R. Heat: *The product should be situated away from heat sources such as radiators, heat registers, stoves or other products that produce heat.*

SM-900 USER GUIDE

INTRODUCTION

The SM-900 is truly the “State of SWR’s Art” in bass amplification electronics. The SM-900 is only slightly deeper and heavier than the SM-500, yet delivers twice the power and includes new features such as our very flexible tone section. Along with shelving-type Bass and Treble controls, the equalization section consists of two independent 3-band semi-parametric EQs. This provides the user with two analog presets via a silent footswitch, or three presets (EQ 1, EQ 2, or EQ 1+2) using the manual slide switch located on the front panel. You can now go from a solid groove sound to soloing with just the tap of your foot. Several suggested EQ settings are included in the tone section of this manual.

The SM-900 also boasts a studio-oriented “side chain” effects loop allowing the user the diversity of an effects unit while maintaining the constant clarity and natural tone of the instrument. SWR’s exclusive “To Tuner” jack is also on a side chain. Remember when you had to unplug your bass from your amp and hook into your tuner and frantically tune up between songs? Or patch the tuner between your instrument and amp, thus degrading sound quality? Those times are history.

Add to the above both stereo and mono effects loops, stereo/mono operation of the power amps, biamp capabilities, up to 900 watts RMS of power, an extremely quiet preamp, a “non-pumping” limiter, complete recording ability, and SWR’s proven reliability and sound quality, and you have what we feel is the best bass amplifier made anywhere in the world.

Every Professional Series product from SWR Sound Corporation is manufactured and hand-built in Sun Valley, California, USA.

SM-900 SPECIFICATIONS

Note: *All measurements were taken with a line voltage of 120VAC. All noise specifications are "unweighted." All voltages and watts are "RMS."*

POWER (minimum):

Bridge/Mono Mode

900 Watts @ 4 Ohms

650 Watts @ 8 Ohms

440 Watts @ 16 Ohms

(minimum load = 4 Ohms)

Stereo Mode (per side)

400 watts @ 4 Ohms

240 watts @ 8 Ohms

144 watts @ 16 ohms

(minimum load = 2 Ohms)

FREQUENCY RESPONSE *(power amplifiers):* –3dB @ 20 Hz and 40kHz

SENSITIVITY *(full output, 8 ohm load, 100 Hz):*

Passive Input Jack: 50 millivolts

Active Input Jack: 200 millivolts

Power Amplifier (Effects Return Jack "in"): 1.6 volts

INPUT IMPEDANCE

Passive/Active Input: 800kohms

Active Input: 60kohms

Effects Return: 27kohms

OUTPUT IMPEDANCE

Effects Send: 100 ohms

Tuner Send: 100 ohms

XLR Balanced Out: 750 ohms

Crossover High and Low Outs: 100 ohms

SIGNAL TO NOISE RATIO: –75 dB (< 8 millivolts typical)

EQUIVALENT INPUT NOISE: 8.9 microvolts

DISTORTION:

Power Amplifiers (Effects Return jack "in"): 0.03% THD

I.M. Distortion: 0.06 %

System Distortion (gain & master volume full, Aural Enhancer at min., tone controls flat): 0.4 % THD

THERMAL PROTECTION:
Both natural convection and thermostatically controled forced air (cooling fan). The internal fan is set to operate when the heatsink reaches 50 degrees centigrade and will automatically shut off upon cooling. This allows silent operation in the studio or other low volume conditions.

COUPLING CAPACITORS IN SIGNAL PATH *(input to output jacks):*

Quantity: 5

Type: High-grade metallized polyester, made in Germany

TUBE COMPLEMENT: One (1) specially-selected 12AX7 vacuum tube (valve).

CHASSIS MATERIAL: All aluminum for light weight and purity. Steel-reinforced rack corners.

ASSEMBLY: Virtually every step of the assembly procedure of the SM-900 is done by hand, in-house, at SWR Sound in Sun Valley, California, USA.

CUSTOM PARTS: The chassis, extruded heatsinks, printed circuit boards, power transformer, owners manual and shipping cartons are all manufactured in California. Our custom rotary potentiometers are made by Noble, Japan.

SIZE *(measured from the rack ears back):* 19" W x 3.45" H x 13.75" D (482.6 x 37.63 x 349.25 mm)

WEIGHT: 22 lbs. (9.98 kg)

FRONT PANEL FEATURES & OPERATING PROCEDURES

EQ FOOTSWITCH JACK

For remote selection of the equalizers, insert the footswitch that came with your SM-900 into this jack. Installing the footswitch will automatically DISCONNECT the manual EQ slide switch located directly above the Aural Enhancer.

Depressing the footswitch will silently select the settings you have decided upon on either EQ bank 1 (bottom row, white knobs) or EQ bank 2 (top row, black knobs). Each bank consists of 3 bands of semi-parametric equalization featuring dual concentric knobs. The INNER knob adjusts cut and boost, and the OUTER knob is for selection of frequency. When you have selected EQ 2 (top three bands), the RED LED located just to the left of these will light. When this LED is OFF, EQ 1 is active. This LED lets you distinguish which band of EQ you are currently using from a distance. EQ 1+2 is NOT obtainable with the footswitch.

The BASS and TREBLE controls are INDEPENDENT of either the footswitch or the manual EQ slide switch. (See “Tone Controls” for further details.)

Disconnecting the footswitch will automatically re-activate the manual slide switch.

INPUT JACKS

Passive/Active Input

A “passive” instrument has no built-in preamp and does not use a battery. An “active” bass, on the other hand, utilizes a battery operated preamp, either for gain, tone controls, or both. Although labeled “Passive,” the Passive input jack will work with all instruments that have a maximum output of less than 1 volt RMS.

Generally speaking, try the Passive input jack first. If you hear a small amount of distortion and

neither the preamp clip LED or the power amp clip LED are activated, try using the Active input jack.

Note: *If you would like to overdrive the first TUBE stage, this can be accomplished by using an external preamp between your instrument and the Passive input. To obtain optimum sound when trying this, make sure the preamp clip LED is not activated. If this occurs, turn down your Gain control. The first preamp tube stage is NOT monitored by the preamp clip circuit for this reason.*

Active Input

The Active input jack should be used with instruments having a built-in (on board) preamp that will produce signals over 1 volt RMS. Basses with really "hot" pickups may be more compatible with the Active input. Let your ears be the judge.

If you are using a KEYBOARD or BASS PEDAL, etc., with the SM-900, we have found the best choice to be the Active input.

Note: *Using the Active input with passive basses may result in a loss of high end transients. Players who roll off their high end starting at about 2kHz or prefer a "darker" sound, may find this input more to their liking.*

If you hear some distortion with your active bass and are using the Active input jack, check your battery. Also, make sure none of the overload indicators are lit. This will save you or your service technician time and aggravation.

GAIN CONTROL

The Gain control adjusts the volume of the preamp section. Since the Gain control is similar to a "pad," a small amount of signal will be heard even with the Gain rotated fully counter-clockwise (with the Master Volume up).

After all EQ settings and the Aural Enhancer are set, the Gain control should be raised until the preamp clip LED barely flashes upon striking your loudest note. This will insure maximum signal-to-noise ratio and prevent unwanted clipping of the preamp section.

Note: *The Gain control serves as an effects send level adjustment. If your effect is being over-driven, turn down the Gain control and re-adjust your Master Volume for correct, overall loudness.*

This control also drives the Limiter circuit. If you are not getting enough effect from your limiter, turn up the Gain control, but be sure to keep an eye on the preamp clip LED.

PREAMP CLIP LED

The preamp clip LED will light whenever the preamp, tone section or output buffer reach clipping (run out of headroom). This function does NOT monitor the first tube stage of the Passive input (see "Passive Input" above for more info). In the event the clip indicator lights, turn down the Gain control. Since this circuit monitors all three tone sections (bass, treble, EQ 1 and EQ 2) independently, boosting any one of these controls can cause the LED to activate. (In the case of EQ 1 or EQ 2, even with the unselected EQ bank.) So, for instance, if you notice the preamp clip indicator lighting, but hear no distortion and are using EQ 1, switch to EQ 2 to see if it is the culprit (or vice-versa).

Naturally, if you want to overdrive the preamp section for a distorted tone, ignore the preamp clip LED, but, be very cautious of the POWER AMP CLIP LED as any clipping at this power level can damage your speaker system.

AURAL ENHANCER

SWR's Aural Enhancer Control was developed to bring out the fundamental low notes of the bass

guitar, reduce certain frequencies that help mask the fundamentals, and enhance the high end transients. Basically a tone-shaping control, the Aural Enhancer is a passive R/C network that alters the frequency response throughout the bass spectrum. This pre-shaping is "blended" into the original signal via the Aural Enhancer Control. Exact frequencies affected are dependent on the characteristics of the instrument used.

TONE CONTROLS AND EQUALIZATION: A BASIC PRIMER

The flexibility of the tone and EQ sections of the SM-900 is one of the most elaborate we have developed. They have the ability to correct “dead” and “hot” spots that may be inherent in your instrument, poor room acoustics, and can bring life to old strings, correct peaks or dips in speaker systems, and best of all, bring out the sonic qualities of your instrument and YOUR playing technique. Although at first glance the number of controls and variables may seem fairly complicated, once you get acquainted with how to use and apply them, they will open doors you never thought possible.

First, let’s put everything into three groups: the Aural Enhancer; Bass and Treble; and one section of the 3 band semi-parametric EQ. Start with the Enhancer at minimum and the Bass, Treble and EQs set flat (mid “click” position). (The INNER knob of the 3-band parametric sets “flat” position.) At a comfortable listening level, run through scales using different positions on the neck—preferably one near the headstock, at about the 5th fret, and up near the twelfth. Were all the notes even? Did some notes seem alive and others dead? Does your open E string and the octave on the twelfth fret sound too similar?

Play and sustain an open “E” note, then play the octave on the twelfth fret. Now repeat this process with the Aural Enhancer shifted from minimum to maximum. You should now hear a discernible difference between these two notes with probably a little more brilliance. You should also be able to “feel” the open “E” better, too.

Repeat the process once again. After playing the octave on the 12th fret, rotate the Enhancer from maximum to 12 o’clock. As you rotate the Enhancer counter-clockwise, you will hear a midrange “growl” added to the sound. For your info, this growl is at about 160Hz and 320Hz.

With this one adjustment, you have added dynamic range and clarity for slapping, and added midrange for finger style playing. The best setting of the Enhancer for optimum results while slapping and playing finger style will depend on your fingers, instrument and speakers.

Listening to these settings may lead you to wanting a little more “bite” in the slap sound. Rotate the Treble control clockwise from its center click position until you’re satisfied. The Treble control should not have as much effect on the finger sound. Go from lows to highs with the slap technique. If the lows don’t have quite the “punch” or “body” to round out the desired dynamics, boost the Bass control from its center click position until it is well-balanced. Of course, if you have too many highs or lows, reverse this process.

Listen closely once again, both to the slap and finger sounds. The bite of the highs in the slap is good, but there may be an irritating sharpness. One area that may be particularly irksome is at about 1.5k to 2kHz. Go to the third band on EQ 1. Make sure the EQ slide switch is in the EQ 1 position (far left). If your footswitch is plugged in, make sure the LED next to EQ 2 is not lit. Turn the frequency knob (the one on the outside) on the third band so that the pointer is set at about 2 kHz (8 o’clock). Turn the level control (the one in the middle) from mid position to approximately –6 dB (9 o’clock). If the irritation is gone but the presence is still there, you may need to boost the Treble slightly to maintain crispness.

OK, you’ve got the high end of your slap sound perfect. The lows and mids still could use some work. Being a perfectionist, you want the impact of a hard-hit snare riding on the wave of a kettle

drum! You want to wake up the guitar player who's been drilling your ears with his Marshall all night!

Turn to the FIRST band of the semi-parametric EQ. Set the frequency knob to approximately 60Hz (9 o'clock). Boost the Level control to about +6 dB (3 o'clock). This should provide the air and impact to carry the notes. To clean up the midrange, adjust the frequency control of the middle band on EQ 1 to 800 Hz (3 o'clock). Adjust the Level control to –8 dB (8:30). All things being fairly equal, you should have a great slap sound, with dynamics, impact, and clarity.

Go back to finger-style. It may be too thin-sounding and the notes are not "even," with some being quite loud and others hardly audible. Flick the EQ select switch to EQ 2 (far right). The LED to the left of the first band should now be lit. Your original finger tone set with the Enhancer, Bass and Treble should still be intact, for the most part.

Since finger styles are so vastly different from player to player, as opposed to a slap style, it is fairly hard to direct the user to specific frequencies with cut and boost parameters. Instead, we will give you several tones (frequencies) for you to experiment with as suggested by some of our noted professional users:

Jimmy Haslip: 80 Hz (first band), +10 dB; 200 Hz & 400 Hz (2nd band), + 2 dB; 1kHz (3rd band), +8 dB

Ricky Minor & Neil Stubenhaus: 40 Hz, +3 dB; 250 Hz, + 4 dB; 1kHz, +3 dB

Charles Frichtel: 100 Hz, +6 dB; 600 Hz, +5 dB; 2.5kHz, –4 dB

Michael Manring: 120 Hz, –2 dB; 1kHz, –6 dB; 6kHz, +2 dB

Dean Cortez: 120 Hz, +5 dB; 600 Hz, +3 dB; 1kHz, +5 dB

Try using each group by itself. As you try them, make a note of the frequencies that are pleasing to your ear and the ones that aren't. Then, make up your own group. Once you're finished, plug in your footswitch, stand a few feet from your speakers, turn it up a little, and play a few slap licks with EQ 1 activated. Then switch to EQ 2 and play a groove.

TONE CONTROLS AND EQUALIZATION

EQ SELECT SLIDE SWITCH

This switch allows you to manually select either EQ 1 (far left position), EQ 2 (far right position), or EQ 1+2 (middle position).

To activate the bottom 3 bands of semi-parametric EQ, select the EQ 1 position. To activate the top three bands, select the EQ 2 position. The LED will light at this position, indicating it is active. We did not provide an LED for EQ 1 as this could confuse you from a distance. So, if the LED is lit, you're using EQ 2. If it is not, you're using EQ 1 or EQ 1+2. Remember, you cannot select EQ 1+2 with the footswitch, just one or the other.

When EQ 1+2 is chosen with the slide switch, all 6 bands of equalization are active. Because the two bands are in parallel with each other, there are two conditions to be aware of in the EQ 1+2 mode: there will be a +4dB boost in overall gain; and cut and boost will be ±7 dB, as opposed to ±15 dB. Normally, if two bands were both set to the same frequency, and both boosted +15 dB for a total of +30 dB, "motorboating" (low frequency oscillation) or feedback (high frequency oscillation) could occur and damage speakers. For this reason, and the fact that more than 15 dB of boost or cut is rarely required, we chose this configuration. If you should require more than the 7 dB offered for any one band in the EQ 1+2 mode, set two bands at the same frequency and boost or cut both of them for a total of 15 dB.

BASS AND TREBLE CONTROLS

The **Bass** control cuts or boosts the lower or bass frequencies. Starting at mid-position, turning the control counter-clockwise cuts the bass response and turning the control clockwise boosts the bass response. The Bass control is a "shelving" type tone control, with the shelving point set at about 120Hz.

The **Treble** control is also a shelving tone control whose shelving point is about 2.5kHz. Starting from mid-position, turning the control counter-clockwise cuts the highs and turning the control clockwise boosts the high frequencies.

A center "click" position on both the Bass and Treble controls indicates flat frequency response, which means NO cut or boost is being heard on that control.

3-BAND SEMI-PARAMETRIC EQUALIZERS

There are two 3-band semi-parametric EQs in the SM-900. They can be thought of as adjustable bass, midrange and treble knobs. The bottom 3 are designated "EQ 1" and the top three and designated "EQ 2." These may be selected by either the footswitch or the manual slide switch located on the front panel.

The term "semi-parametric" in this case means that it has a cut and boost function *and* a frequency select function. If a bandwidth (Q) control was added, it would become a fully parametric equalizer. A graphic EQ is similar to tone controls such as the Bass and Treble controls, except that it uses slide controls or "faders." The semi-parametric has the advantage of allowing you to select which frequency is cut or boosted by the level control. A regular equalizer has fixed center frequencies and cannot be altered by the user.

On each band of the semi-parametric EQ there are two concentric knobs. The inner knob is the LEVEL control. It cuts or boosts the frequency set by the FREQUENCY control, which is the outer knob. If the LEVEL control is in its flat, center-click position, that band will be essentially off. Moving the frequency (outer) knob with the level control in the flat position will have NO AFFECT on the sound or tonal structure. The level control MUST be in a cut or boost (off center) for any change in tone to be audible.

FEEDBACK AND/OR SUSTAIN:

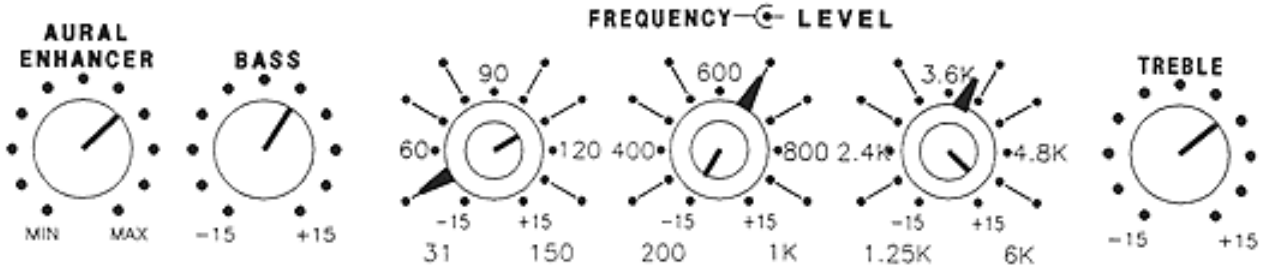
The low mid to hi midrange areas (80 Hz to 1 kHz) found on the semi-parametric EQ can be extremely useful in correcting feedback in acoustic bass guitars or upright basses. If you are getting a slight amount of feedback from your instrument, try the following:

Set your volume to a point where the feedback is just occurring, but not out of control; raise the Level control of the first or second band of the parametric EQ that is activated to about +7 dB; slowly rotate the Frequency control from left to right. At some point on either the first or second band during the rotation of the Frequency control, the feedback should get more intense. This is the frequency area that needs attention. Leave the Frequency control at the position the feedback gets louder; now adjust the Level control in the CUT mode until the feedback disappears. You may find that as you raise the volume, you may need to further cut the Level control to achieve the desired playing volume. In this example, when the feedback becomes more intense, make sure it is the same "pitch" as the original feedback. Feedback can be induced at different frequencies by boosting them and you certainly don't need two problem areas.

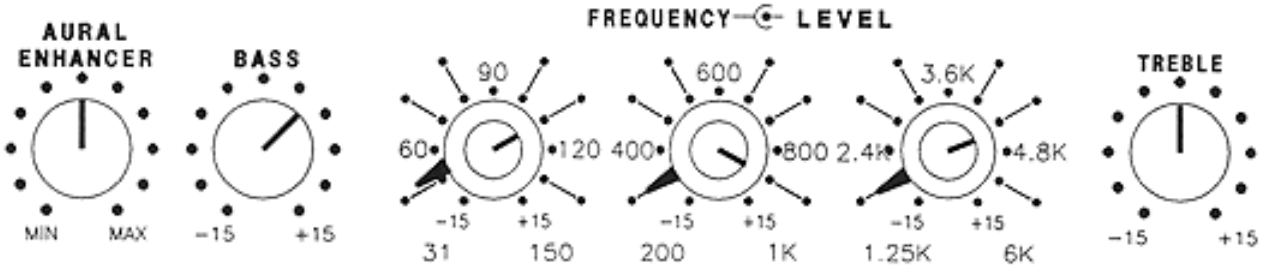
By reversing the technique above, you can achieve greater sustain in certain areas or on certain notes. You can also use these guidelines to correct hot or dead spots on the neck of your instrument or inherent in your speaker system.

TONE CHARTS AND SUGGESTIONS

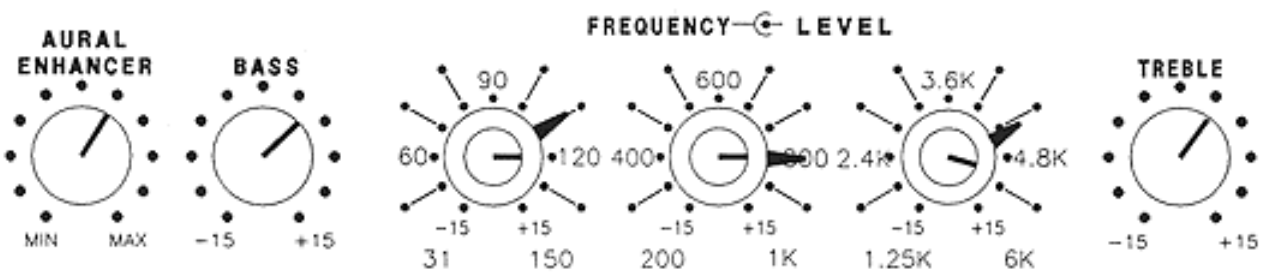
GRAND PIANO (FOR "P" BASS)



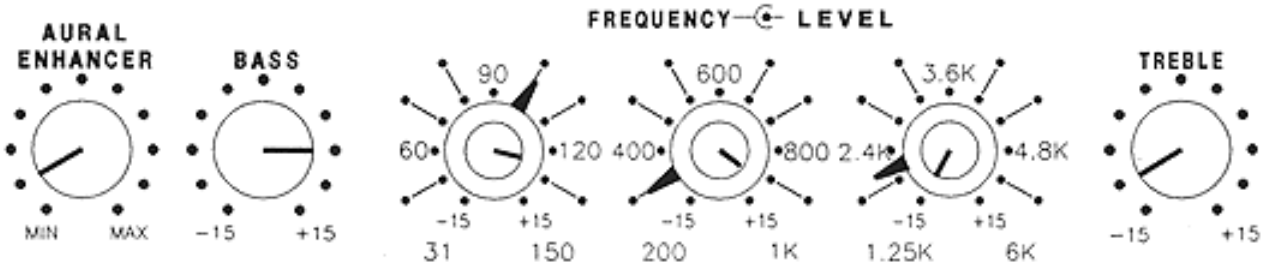
ACOUSTIC 360



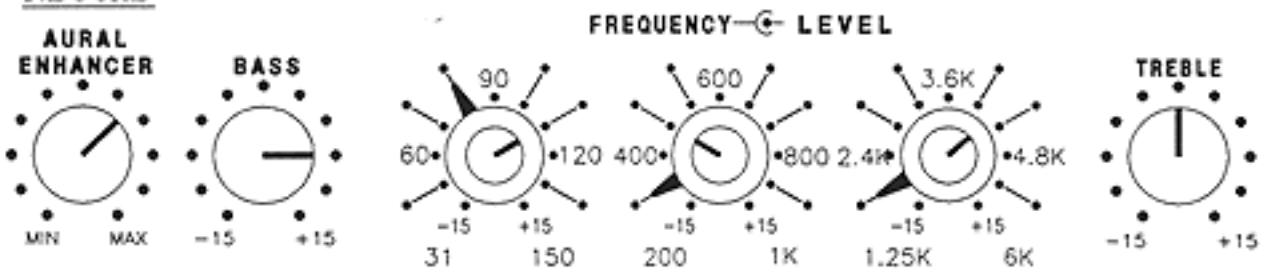
PICK (MUTE STRINGS)



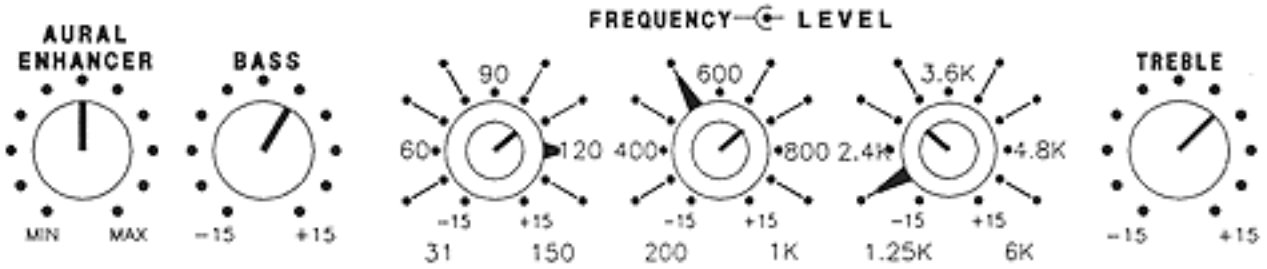
SMOKE−INNA−GODDA−DA−IRON MAN (PASSIVE INPUT, GAIN MAX)



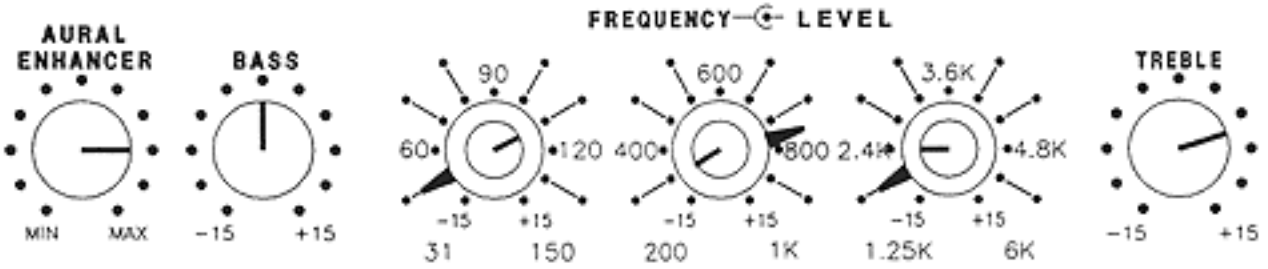
REGGAE



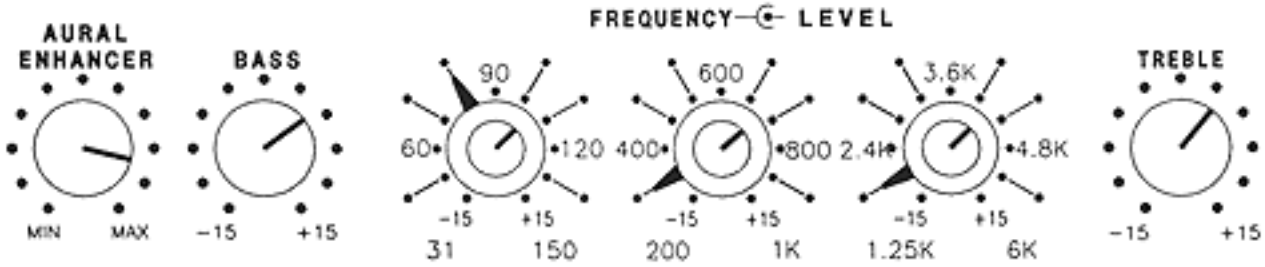
JAZZ



SLAP/POP



ROCK



TONE CHARTS AND SUGGESTIONS

The following two pages include suggested settings to get you acquainted with the limitless variety of tones possible with the SM-900. By setting EQ 1 to the "Acoustic 360" and EQ 2 to the "Grand Piano" settings, for example, you can switch back and forth with the footswitch and see the variety of diverse sounds available to you on the SM-900.

CROSSOVER FREQUENCY

This function sets the crossover point or dividing point of the sound spectrum and sends the lower notes to the LOW output jack on the back panel and the higher, treble notes to the HI output jack on the back panel. For example, if the Frequency is set at mid-position or 500Hz, all frequencies BELOW 500 Hz will appear at the LOW output jack. All frequencies ABOVE 500Hz will be present at the HI output jack.

If you are still confused on how to set the crossover point, you can refer to the owners manual that came with your speakers. It will probably recommend a crossover point. Another reference, which is probably the best, is your own ears. Once you have set up your system, rotate the Crossover Frequency control until the sound seems balanced or, simply, sounds the best.

The crossover slope is 12 dB per octave.

> ***Note:*** *Nearly all of SWR's speaker systems are desinged to be run FULL RANGE and bi-amping is not recommended for all situations. Bi-amping causes a natural "suck out" at the crossover point and some phase problems can occur.*

BALANCE

The Balance control works only when biamping (refer to page 19). The Balance control sets the levels of the highs and lows with respect to each other. Since this circuit is passive, rotating the Balance control towards the *low* position cuts the *highs*. Likewise, rotating the control towards the *hi* position cuts the *lows*. Therefore, if you need more lows and less highs, rotate the control counter-clockwise from mid-position. If you need more highs and less lows, rotate the control clockwise from mid-position.

LIMITER

The Limiter control is actually a Threshold adjustment for the Limiter circuit. In the fully counter-clockwise position, the limiter circuit is disengaged. As you rotate the control clockwise, the threshold (point at which the Limiter circuit is engaged) is lowered. The LED to the right of this control will light when the limiter is working. The farther the control is rotated, the more drastic the limiting becomes and a "fatter" sound is achieved.

The Limiter circuit in the SM-900 adds NO noise and very little distortion. You should also notice that there is little "pumping" or "drop off" as experienced in lesser-quality units. The design of the limiter circuit has what is known as a "soft knee." This essentially means that you can get a compression effect as the limiter threshold is just engaged.

The Limiter circuit is driven by the Gain control and the amount of cut and boost in the tone section. If you desire more limiting than is achievable with the Limiter control at maximum, turn up the Gain control (but keep an eye on the preamp clip LED).

We put the Limiter circuit just before the Effects Loop. If, on some of the peaks, you are overdriving your effects, you can correct the problem using the Limiter. Any undesired loss in volume caused by the Limiter can be made up by raising the Master Volume.

EFFECTS BLEND

This function blends the signal from your instrument with that coming from your effects unit. With the Effects Blend fully counter-clockwise ("dry"), no signal from your effect will be heard. As you

turn this control clockwise, more of the effect can be heard in the overall sound. When the Blend knob is fully clockwise ("wet"), no true or unaffected signal is heard other than what your effects unit provides.

The Effects Blend circuit is similar to that used on recording consoles with the effects loop on a "side chain" to the normal circuit. Unless the control is set to the fully "wet" position, you will always get the full sound of your instrument and get the diversity that an effects unit offers. This circuit is also effective in reducing noise caused by effects units because it is located after the gain stages. When not using an effect, the Blend control should be in the fully counter-clockwise ("dry") position.

> ***Note:*** *See the "Effects Loop" section of the Rear Panel and the diagrams beginning on page 20 for further information and patching instructions.*

DUAL MASTER VOLUME

The inner knob adjusts the level of the left power amp; the outer knob adjusts the level of the right amp. They do NOT affect the level of the record XLR output in the "line" position. This configuration allows the user added flexibility when using the SM-900 in Stereo mode. For example: You are using the left channel for your monitoring and the right channel is across the stage next to the drummer. The independent Master Volume controls allow you to set a different level for each situation.

Losses caused by effects units can be recovered by raising the Master Volume.

If the power amp clip LED lights more than occasionally, turn down the Master Volume to correct this condition.

> ***Note:*** *When using one channel only in stereo mode, use the LEFT side.*

POWER AMP CLIP LED

The power amp clip LED will light when the internal power amps reach clipping or run out of headroom. If this LED lights more than occasionally, the Master Volume should be turned down. Constant clipping of a power amplifier will not harm the electronics, but *can harm your speaker system!* Speakers that have failed due to continuous clipping of a power amplifier are generally not covered under warranty. Once again, to correct this situation, turn down the Master Volume or adjust your Limiter.

POWER LED

The Power LED will light when the power switch (on the rear panel) is turned to the "on" position.

REAR PANEL FEATURES

XLR BALANCED OUTPUT

The XLR Balanced output is a true electronically balanced output; the output level is set by the XLR pad control. The signal appearing at this output is determined by the position of the Line/Direct switch (directly below).

When using the XLR Balanced output for recording, optimum results can be achieved by driving the tape deck direct. Always use the XLR pad control to adjust working levels or attain the drive needed in studio situations. The use of input pads on consoles can deteriorate sound quality.

Wiring for the XLR connector is as follows:

Pin 1 = ground, Pin 2 = + (hot), Pin 3 = – (American Standard)*

* Please take note of this if your are using this connector outside of the United States.

SM-900 models with a serial number of 2706 and greater are compatible with Phantom Power-equipped mixing consoles.

LINE/DIRECT SWITCH

In the "Direct" position of this switch, the XLR is essentially an active tube direct box, and the signal is taken directly from the input jacks. Controls on the front panel DO NOT affect the sound, volume or content of the signal. In the "Line" position, ALL controls on the front panel (except the Effects Blend and Master Volume), affect the signal. Output level in this position is determined by both the Gain and XLR pad controls.

Make sure this switch is set all the way to one side or the other (not positioned somewhere in between, which could result in no output).

XLR PAD AND GROUND LIFT

The XLR Pad control adjusts the signal level appearing at the XLR Balanced Output in both the Line and Direct modes. The level is increased as the control is turned clockwise.

If you are in the "Line" position and change the Gain control on the front panel, the level will also change at the balanced output. The XLR pad can be readjusted without affecting any other function.

A ground lift is provided for the XLR Balanced Output; it is built into the XLR Pad. When the knob on the XLR pad is in the "In" position, the ground to pin 1 is engaged. Pulling the knob to the "Ground Lift" position (out) will interrupt or defeat the ground to pin 1. If a persistent hum exists after trying both positions of the Ground Lift function, there may be a problem with the AC voltage or possibly a dirty AC line.

TO TUNER INPUT

The "To Tuner" input jack allows the user to connect an instrument tuner and tune up without having to unplug and go back and forth from amp to tuner. This feature is totally isolated from the rest of the preamp and will function regardless of the settings of any control on the front panel. Being isolated on a side chain avoids loading down of the instrument, which can cause a loss in dynamic range.

To use this feature, connect a shielded patch cable from the "To Tuner" input to the INPUT on your tuner. Turn the amplifier on and you're ready to go. If you don't want to monitor your sound while tuning up, turn down the Master Volume.

CROSSOVER HI AND LOW OUT JACKS

These jacks provide a LINE LEVEL output that can be sent to either an external power amp or the internal power amps of the SM-900 via shielded patch cables. You cannot connect speakers directly to these outputs (see diagram on page 19).

Present at the Low jack are all frequencies below the point set by the Crossover Frequency control on the front panel. Present at the High jack are all frequencies above the point set by the Crossover Frequency control. ALWAYS use a high-quality shielded patch cable that is as short as possible for bi-amp connections.

BI-AMPING WITH THE SM-900

Bi-amping is the process of driving two separate cabinets, one for high frequencies and one for low frequencies, with separate power amplifiers. We have found bi-amping to be most useful in situations where the user wants to run effects on the high frequencies while keeping the low frequencies "dry." This allows the user to utilize effects without sacrificing a solid bottom end.

To bi-amp with the SM-900, run patch cables from the Crossover Outs to each of the Stereo

effects returns (i.e., one cable from the "High" out jack to the Left stereo effects return, and one cable from the "Low" out to the Right stereo effects return). In this configuration, connect your low end speakers (woofers) to the Right speaker output jacks, and your high end speakers (midrange/tweeters) to the Left speaker output jacks. Use the Balance control on the front panel to even out the highs and lows (see diagram on page 19).

> ***Note:*** *The Effects Blend control must be in the fully "wet" position. If not, you will be getting full- range signals sent to your power amps and NOT the signals sent by the electronic crossover. Similarly, the Power Amp Assign switch MUST be in the "Stereo" position.*

An effects unit may be placed in between each of the Crossover Out jacks and the Stereo Effects Return jacks. This allows you to run an effect for just the lows or highs (or both) using multiple stereo effects units. The MONO effects return is BEFORE (PRE) the electronic crossover circuit. This allows the user to insert a mono effects unit that will be sent to both the Low and High output jacks.

A diagram showing proper connections for bi-amp operation appears on page 19.

EFFECTS LOOP

Both Mono and Stereo Effects Loops are provided on the SM-900, though it should be noted that both cannot be used simultaneously. Always use high quality shielded patch cables for all connections between the amplifier and your effects units. We recommend that the cables be as short as possible.

The amount of signal present at the Effects Send jack is determined by the setting of the Gain control on the front panel. If your effects unit is overloading and it does not provide for compensating incoming signals (such as an input volume, or switches marked +4 or –10), you may turn down the Gain control to avoid this condition. If your effects unit has input level adjustments, they should be set for either 0dB or +4dB.

The Master Volume may be used to recover losses in gain caused by some effects units.

Use the Blend control to adjust the amount of "effects" with the natural signal from your instrument.

> ***Note:*** *You will not hear any sound from your effects if the Effects Blend control is in the fully counter-clockwise ("dry") position.*

To use the **mono** Effects Loop, run a shielded patch cable from the "Send" jack of the SM-900 to the input of your effects unit. Run a second patch cable from the output of your effects unit to the *mono* effects return jack. Now adjust the Effects Blend control for the mix you desire.

To use the **stereo** Effects Loop, run a patch cable from the "Send" jack of the SM-900 to the mono input of your stereo effects unit (either the left or right input—check the effects unit and/or its owners manual). If your effects unit does not provide a mono input, get a "Y" mono cord from your local music or electronics store. Plug the common end in the effects Send jack and the other two ends in the left and right inputs of your effect (see diagram, page 20).

If you wish to use just the internal power amps in the SM-900, the Effects Return jacks will serve as the "inputs." Insert your MONO signal source in the MONO Effects Return jack. This will send the source to both power amps. If you have a stereo source, plug the left and right outputs into the corresponding Effects Return Jacks. If you want to use just one side of the amp, use the LEFT CHANNEL ONLY (the thermostat that regulates the fan is located on the left side).

STEREO/BRIDGE POWER AMP ASSIGN SWITCH

To run your amplifier in the stereo mode, move the Power Amp Assign Switch to the "Stereo" (top) position. You will need to use the speaker outputs marked "Left" and "Right." To run the SM-900

in mono, move the switch to the bottom “Bridge/Mono” position. Your speakers must then be plugged into the Speakon® jack marked “Bridge” (see diagram, page 17).

We recommend using caution when connecting your system in “Bridge/Mono” mode. Because the SM-900 delivers 650 watts RMS minimum into 8 ohms and 900 watts minimum into 4 ohms, damage can result very quickly to speakers not capable of handling this much power. If you have or need to use a single enclosure with a power handling capacity of less than 650 watts (8 ohms), or 900 watts (4 ohms), run the amp in Stereo and use just the LEFT speaker output. No harm will come to your amplifier by leaving the Right speaker output disconnected.

Minimum Load in the Bridge/Mono mode is 4 ohms.

Minimum Load in the Stereo mode is 2 ohms per channel.

SPEAKER FUSES

Speaker fuses are provided to protect your speakers in the unlikely event of a power amp failure, incorrect connection procedures, or impedances below recommended ratings. Size and rating of the fuses are 3AG, 10 amp, fast-blo. Do not defeat the purpose of this feature by using a higher rated fuse as it could further damage your amp and void your warranty.

The fuses can open if there is a fault in the speaker cable or the speakers themselves. Therefore, it is wise to carry extra fuses at ALL TIMES.

SPEAKER OUTPUT JACKS

Unlike most amplifiers on the market, all SWR amplifiers can be used for recording purposes using only the XLR Balanced out, and without speakers connected to the speaker output jacks.

Note: *If you are using only one channel (in stereo mode), use the left channel speaker output as the thermal sensor for the fan is located on the left heat sink.*

When used in the stereo mode, the internal power amplifiers of the SM-900 will deliver 500 watts per side into 2 ohms, 400 watts per side into 4 ohms, and 240 watts per side into 8 ohms. For optimum performance, we recommend using a total of 4 ohms per channel. When using 2 ohm loads, the amplifier will run hotter than normal and the internal fan will be running most of the time. Minimum speaker load in the stereo mode is 2 ohms per side.

When used in Bridge Mode, the SM-900 will deliver 440 watts into 16 ohms, 650 watts into 8 ohms and 900 watts into 4 ohm loads. Please make sure the speakers you use in this mode can handle the power. Minimum load in Bridge Mode is 4 ohms.

LEFT & RIGHT SPEAKER JACKS

There are two 1/4" jacks and one Speakon® jack provided for each side of the SM-900’s output section. The Left and Right speaker jacks are provided for use in the Stereo Mode only. DO NOT use these jacks when the SM-900 is switched to the Bridge Mode. Balance between left and right channels can be obtained by using the Stereo Master Volume control located on the front panel. Make sure all speakers are connected BEFORE turning on the SM-900. Never plug or unplug your speakers while the unit is on.

SPEAKER CABLE

Speaker cable should be made of 18-gauge, or heavier, wire. (The thicker the wire, the lower the gauge, so 18-gauge is heavier than 20-gauge and so on.) Do not use instrument cables to hook up your speakers. This can result in intermittent power loss, cause your power amp to oscillate

and damage itself (and/or your speakers), and render the cables useless for any purpose.

BRIDGE MODE SPEAKON® JACK

The Speakon® jack located directly below the Power Amp Assign switch (in the center of the Speaker Output Section) is provided for use in the Bridge Mode only. A six foot speaker cable (Speakon-to- Speakon) is provided with the SM-900 for your convenience. Please make sure that all connections are complete before turning the SM-900's power switch to the "On" position.

GENERAL AMP & SPEAKER TIPS

Make sure your speakers can handle the power provided by the SM-900 in Bridge/Mono mode. Speakers that have been overdriven are easy to detect and generally do not fall under a manufacturer's warranty.

In order to give bassists the same punch and clarity found in the studio or in concert PA systems, the SWR SM-900 was designed with a frequency response far greater (20Hz to 40kHz) than that generally found in musical instrument amplifiers.

If you notice the fan is still engaged after playing through your SM-900, let it run for a couple of minutes to cool itself off. This will help extend the life of the internal components.

Upon powering up the SM-900, you will notice an initial turn-on transient heard as a "thud" in your speakers. This will not harm speakers made by SWR, however, if you'd rather not hear this transient, turn on the SM-900 first, and then attach your speakers. Just be sure you aren't playing when you connect the speakers, as it may cause a speaker fuse to blow.

POWER SWITCH

Setting the power switch to the right "On" position activates the electronics in your SM-900 as indicated by the power LED lighting on the front panel.

AC LINE (MAINS) FUSE

This fuse is provided to protect the internal electronics against power surges, etc. It also protects the unit against itself should one of the internal components fail. If this fuse should open, replace it with the same type of fuse and rating. Do not defeat the purpose of this feature by replacing this fuse with a fuse of a higher value. It will void your warranty.

Proper size of the AC fuse for all countries is 3AG. Proper rating of the fuse is as follows:

United States: 8 amp, slo-blo

Japan: 9 amp, slo-blo

Europe (240V): 4 amp, slo-blo

AC CORD RECEPTACLE

The AC Cord receptacle accepts a standard AC power cable (supplied with the SM-900). If your AC cord is lost, a replacement can be purchased at almost any electronics, computer or pro audio store.

> ***Note:*** *The rating for this cable is 3 conductor, 10 amperes MINIMUM. If replacement is necessary, or if you wish to buy a longer cable, look for the rating on the cable and be sure it is at least 10 amps.*

Make sure the AC cord is plugged all the way into both the amplifier and the wall socket. If your cord ever becomes frayed or split, replace it immediately.

RACK MOUNTING YOUR SM-900

SWR's SM-900 is rackmountable, requiring no additional parts or accessories, other than rack screws and the rack case itself. By installing your SM-900 in a rack case, you will help preserve its beauty and protect the amp from accidental physical damage.

The SM-900 should be mounted as close to the bottom of the rack case as possible. The height of the rubber feet was chosen so that when you slide the unit in the bottom of the rack case, the rack mounting holes on the front panel should line up with the mounting holes of the rack rail. This prevents the unit from flexing downward if the rack case is dropped. If you need to remove the rubber feet from the bottom of the SM-900, be sure to replace the screws, as they reinforce the chassis.

If you must mount the SM-900 in the middle of the rack, a piece of wood or similar material should be installed between the bottom of the rack case and the bottom of the SM-900. This will help prevent flexing of the chassis. Although we have installed an additional steel bracket for strength, severe or constant flexing of the chassis can cause the main chassis to weaken or crack and can void your warranty.

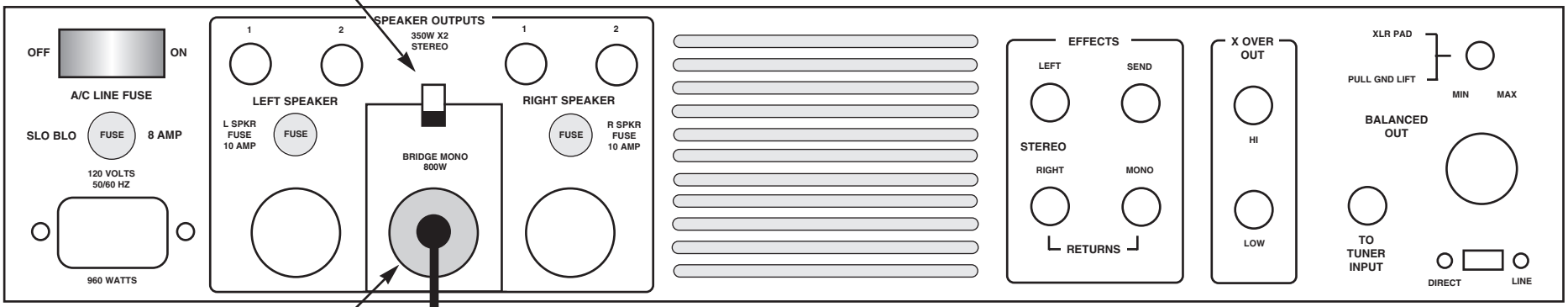
Make sure there is adequate space between the sides of the SM-900 and the sides of the rack case for proper ventilation.

Don't neglect your amp after it has been installed in a rack case. Occassionaly check the screws holding the amp into the rack, making sure they are tight. Continuous transportation and vibration can cause screws to become loose, both on the unit and with your rack case rails. At least once a month, remove the SM-900 from the case and tighten all outside screws, especially on the front panel, and wipe off the outside of the chassis with a damp cloth. Then check all the connections in your rack case and reinstall your unit.

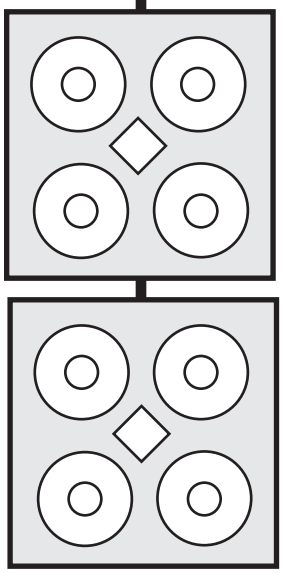
SM-900 Bridge Mode Operation Diagram

Power Amp Assign Switch set to “Bridge Mono” position.

Note: When the power amp assign switch is set to the Bridge/Mono position, only the center Speakon output jack may be used. The SM-900 delivers a minimum of 900 Watts RMS into a 4 ohm load, and 650 Watts RMS into an 8 ohm load. Please make sure that your speaker system is capable of handling this amount of power.



Center Bridge/Mono Speakon Output Jack must be used.



Speaker 1 = 8 Ohms

Speaker 2 = 8 Ohms

This example shows two 8 ohm speaker enclosures connected in parallel for a total load of 4 ohms. This is the minimum impedance that the SM-900 is designed to drive safely in the Bridge Mode. Connecting multiple enclosures that have a combined total impedance of less than 4 ohms may result in damage to your amplifier.

The following cabinet configurations may be used:

- one 4 ohm enclosure
- one 8 ohm enclosure
- two 8 ohm enclosures
- four 16 ohm enclosures

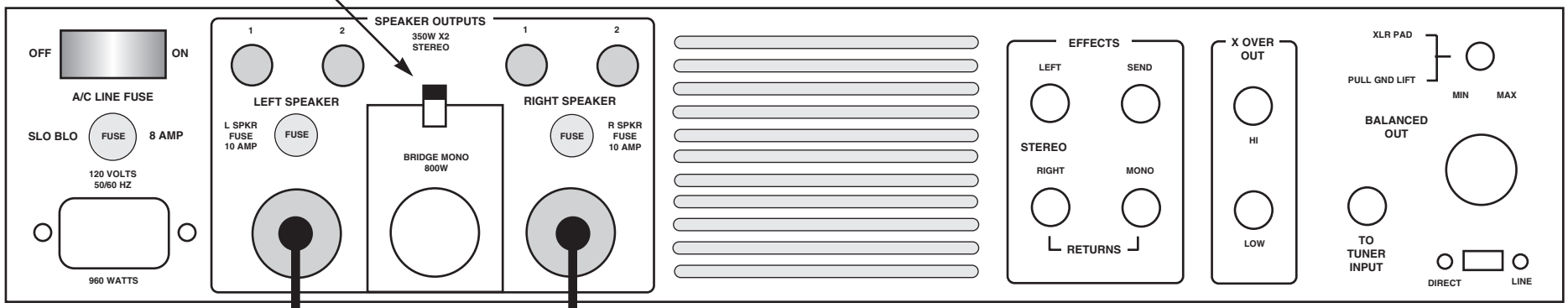
SM-900 Power Output Ratings

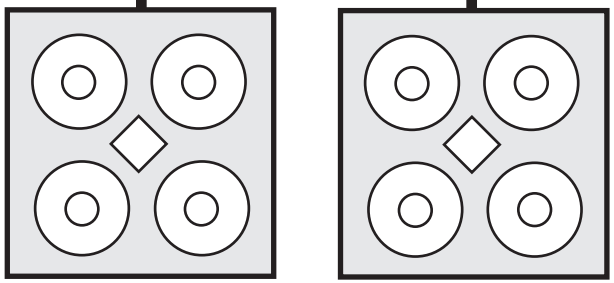
Bridge/Mono Mode
900 Watts @ 4 Ohms
650 Watts @ 8 Ohms
440 Watts @ 16 Ohms
(minimum load = 4 Ohms)

SM-900 Stereo Mode Operation Diagram

Power Amp Assign Switch set to “Stereo” position.

Note: When the power amp assign switch is set to the “Stereo” position, only the right and left Speakon output jacks or left and right 1/4” output jacks may be used. Do not use the center Speakon jack as it is provided for Bridge/Mono operation only.





Speaker 1 = 8 Ohms

Speaker 2 = 8 Ohms

This example shows two 8 ohm speaker enclosures, each connected to one side of the stereo power amp for a total load of 8 ohms per side. Although the minimum impedance that the SM-900 is designed to drive safely in the Stereo Mode is 2 ohms (per side), 4 ohms per side or greater is recommended. Connecting multiple enclosures that have a combined total impedance of less than 2 ohms per side may result in damage to your amplifier.

The following cabinet configurations can be used:

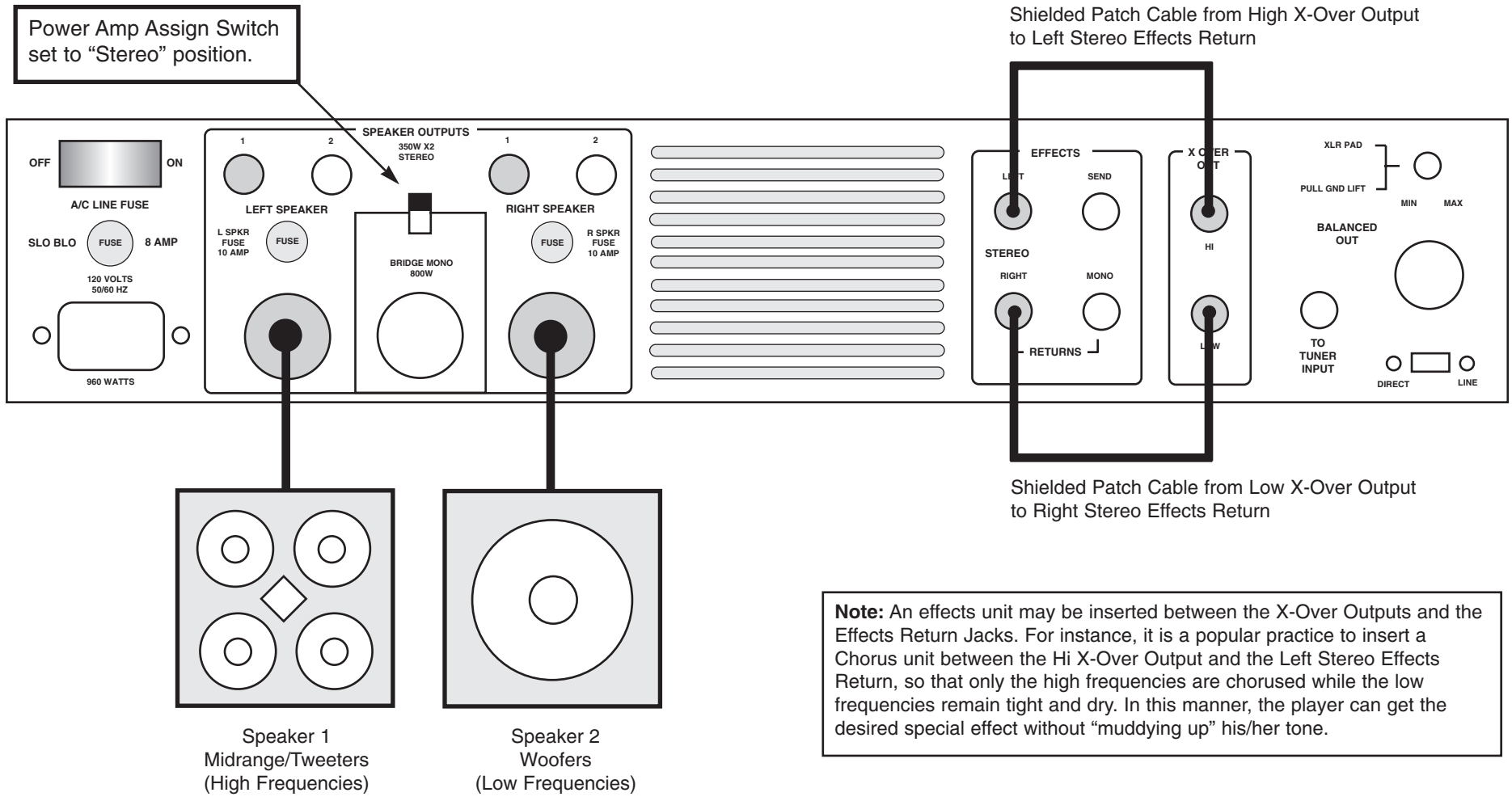
- one 2 ohm enclosure (per side)
- one 4 ohm enclosure (per side)
- one 8 ohm enclosure (per side)
- two 4 ohm enclosures (per side)
- two 8 ohm enclosures (per side)

SM-900 Power Output Ratings

Stereo Mode (per side)
400 watts @ 4 Ohms
240 watts @ 8 Ohms
144 watts @ 16 Ohms
(minimum load = 2 Ohms)

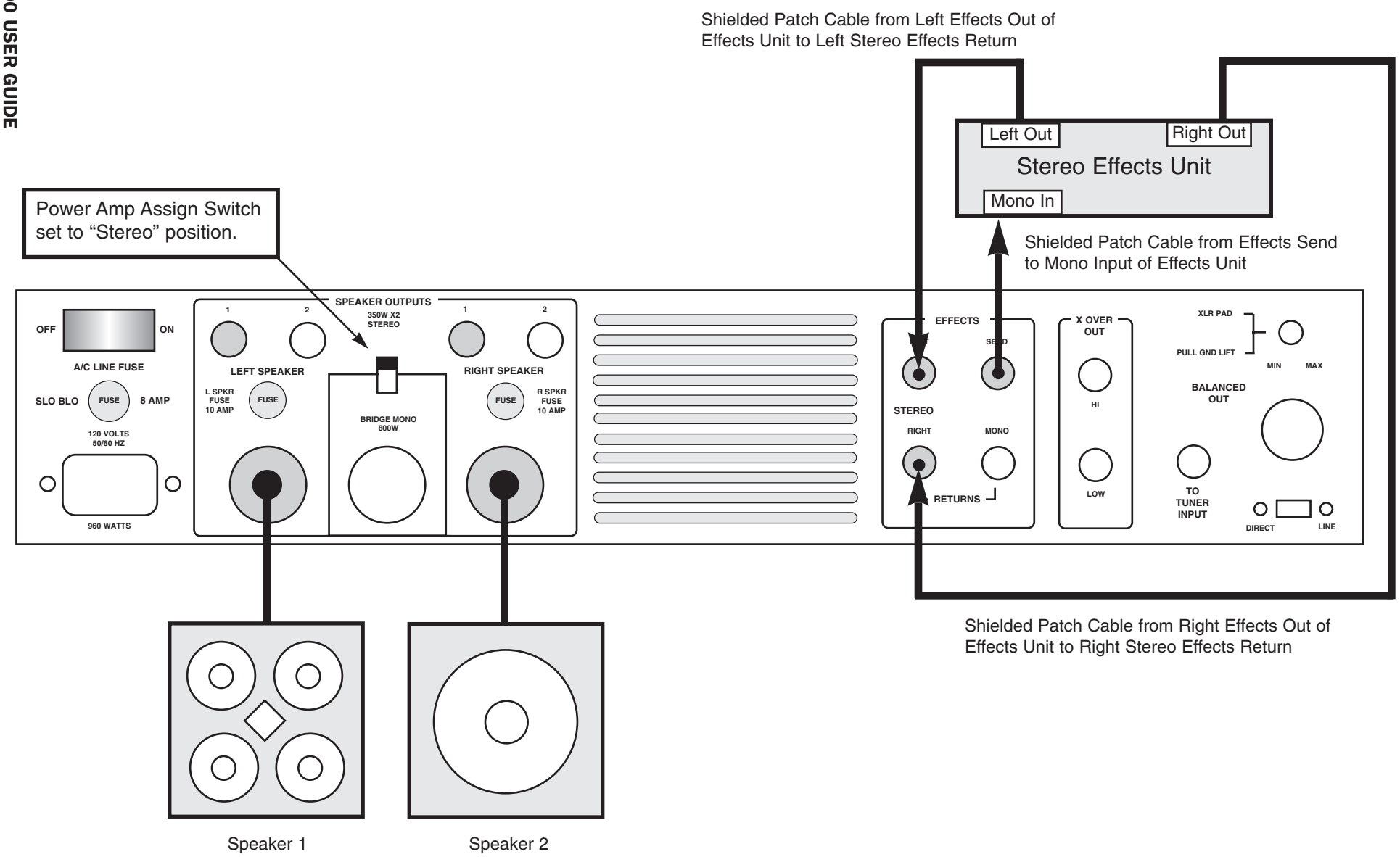
SM-900 Bi-Amp Operation Diagram

For Bi-Amp operation, the power amp assign switch must be set to the “Stereo” position, only the right and left Speakon output jacks or left and right 1/4” output jacks may be used.



Note: An effects unit may be inserted between the X-Over Outputs and the Effects Return Jacks. For instance, it is a popular practice to insert a Chorus unit between the Hi X-Over Output and the Left Stereo Effects Return, so that only the high frequencies are chorused while the low frequencies remain tight and dry. In this manner, the player can get the desired special effect without “muddying up” his/her tone.

SM-900 Stereo Effects Patching Diagram



SM-900 LIMITED WARRANTY

The ***SM-900*** from SWR is warranted to the original consumer purchaser for TWO YEARS from the date of purchase against defects in materials and workmanship, provided that it is purchased from an Authorized SWR dealer. This warranty applies only to products purchased in the USA or Canada.

This warranty is VOID if the unit has been damaged due to accident, improper handling, installation or operation, shipping damage, abuse or misuse, unauthorized repair or attempted repair, or if the serial number has been defaced or removed. FMIC reserves the right to make such determination on the basis of inspection by an Authorized FMIC Service Center.

All liability for any incidental or consequential damages for breach of any expressed or implied warranties is disclaimed and excluded herefrom.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so that the above 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.

SHOULD YOUR SWR AMPLIFIER REQUIRE SERVICE OR REPAIR, PLEASE USE THE FOLLOWING PROCEDURE:

1 Locate your original receipt showing date of purchase, model and serial number.

2 Determine the closest Authorized FMIC Service Center to your location. The fastest way to get a complete list of Authorized FMIC Service Centers is on the web at:

http://www.mrgearhead.com/faq/allservice.html

You can also get this information by calling FMIC Consumer Relations at (480) 596-7195

3 To receive warranty service, return the complete product to an Authorized FMIC Electronics Service Center, with proof of purchase, during the applicable warranty period. Transportation costs are not included in this Limited Warranty.

4 Defective products that qualify for coverage under this warranty will be repaired or replaced, at FMIC's discretion, with a like or comparable product, without charge.

For a complete list of Authorized FMIC Service Centers, and the latest SWR news, interviews, and more, check out our website:

swrsound.com

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