SM-400
(Original Version)

Please Note: The SM-400 is no longer in production (it was upgraded in 1993). The text below is provided for the convenience of SWR users who purchased this model on the used market.

RACK MOUNTING INSTRUCTIONS

To preserve the beauty and reliability of your amplifier, we recommend that you install your amp in a rack case. The SM-400 is completely ready to be rack mounted and needs no additional parts or accessories other than the case itself.
Although this model takes up only two rack spaces (3 1/2"), we recommend you use a three rack space case. This will prevent the vents on the top and bottom of your amplifier from being covered and allow for natural cooling of the power section(s). NO FAN is needed in this condition and you will not have to remove the rubber feet. If you still would like to remove the feet, REPLACE the screws as they help to hold on the bottom of the amplifier - THIS IS VERY IMPORTANT!
The SM-400 should be mounted as close to the bottom of the rack case as possible. The height of the rubber feet have been 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 SM-400 from flexing downward if the rack case is dropped. If you must mount the SM-400 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 amplifier to prevent flexing of the amplifier's chassis. Severe or constant flexing of the chassis can cause the main chassis to crack and could void your warranty.
MAKE SURE ALL VENTS ARE UNOBSTRUCTED WHEN INSTALLING YOUR SM-400 IN A RACK CASE. THIS WILL ALLOW FOR COOL AIR TO COME IN AND HOT AIR TO ESCAPE.
If you should have any other questions that are not answered in the owner's manual, feel free to email or call the factory (818) 253-4SWR at anytime.

GENERAL INFORMATION AND DESCRIPTION

The SM-400 Bass Amplifier provides the power, performance, flexibility and portability needed by the professional bass musician for every style of playing and nearly every situation he/she will encounter.
To accomplish our goals, we had to use almost every imaginable type of electronic component available. This added up to an all TUBE preamp section, a limiter using Field Effect Transistors, tone and equalizer controls utilizing Integrated Circuits and two individual power amps employing discreet, solid state devices.
The power amplifiers in the SM-400 can be used individually to provide full bi-amp capabilities when used with the built-in adjustable electronic crossover or can function as stereo, 200 watt power units. If you need more power, the amps can be bridged for 400 Watts @ 8 ohms or 420 watts @ 4 ohms.
Front panel features include Hi and Low Gain input jacks, Gain and Master Volume controls, Integral Limiter and an exclusive feature we call an Aural Enhancer. Tonal flexibility is achieved with Bass and Treble controls and a 4 band Variable Graphic Equalizer. The Crossover Frequency Control adjusts the crossover points of the electronic crossover and the Balance control adjusts the levels of the two power amps when used in the stereo mode.
The back panel features and XLR Balanced Out switchable for direct and line out, Crossover High and Low Frequency Output jacks, and Mono and Stereo Effects loops. A power amp assign switch selects stereo or bridge mode and for speaker outputs, there are two jacks each for left and right out or one banana jack for mono operation.
The SM-400 is rack mountable, taking up two rack spaces (3 1/2") by 11 3/4" deep. It is housed in an all aluminum chassis for light weight and lasting beauty and weighs just over 18 pounds. It is easily carried by the handles secured to the front panel.
The tube employed in the preamplifier is a specially selected 12AX7 and should not need replacing for one to three years depending on usage and care of your unit.
We truly hope you enjoy your amplifier and find it all you have ever wanted in a bass amplifier and more. If you ever have any questions or suggestions, please don't hesitate to call or email us at the factory.

FRONT PANEL FEATURES

HI AND LOW GAIN INPUT JACKS

Both inputs accept a standard 1/4" phone plug and both inputs can be used at the same time. Since the two inputs are totally independent, no loss in volume or tone will occur if two instruments are used simultaneously. Keep in mind, however, that the Hi Gain input has five times more gain than the Low Gain input.

GAIN CONTROL AND PREAMP CLIP LED

The Gain Control adjusts the volume of the preamp section. After tone controls, Variable Graphic Equalizer and Limiter are set to your liking, the Gain Control should be set to where the Preamp Clip LED barely flashes upon striking your loudest note. Now adjust the Master Volume to the desired volume level. Utilizing these controls in this manner assures the user of maximum signal to noise ratio with no distortion caused by the preamp circuits "clipping".
The Preamp Clip LED will light if any portion of the preamplifier reaches clipping or runs out of headroom. This can be caused by the Gain Control being set too high or any tone or Equalizer Control set in a high boost position. To correct this condition, turn down one of the previously mentioned controls.
Note: The Preamp Clip LED indicates that at some point the preamplifier is clipping. No harm is being done to your

amplifier but, CLIPPING OF THE POWER AMPLIFIER CAN CAUSE DAMAGE TO YOUR LOUDSPEAKERS AND IS NOT RECOMMENDED!

LIMITER

The Threshold Control sets the level at which limiting begins to take effect. At that point the LED will light. Maximum limiting will occur with the Threshold Control set in the Maximum position. The limiter is completely out of the circuit with the Threshold Control set in the Minimum position. Loss in volume caused by extreme limiting can be overcome by increasing the Master Volume control.
Note: If the Threshold is set at maximum and still no limiting effect occurs, the Gain Control is set too low and should be increased to a desired level.

AURAL ENHANCER

The Aural Enhancer was developed to help bring out the fundamental notes of the bass guitar and give a resulting frequency response similar to that used for recording the bass in the studio. This effect becomes more radical as the control is turned to maximum. The result is a more "transparent" sound and is especially noticeable with a slap style technique of playing.

BASS CONTROL

The Bass Control is a shelving type tone control that cuts or boosts the lower or bass frequencies from mid-position. Starting at mid-position, turning the control counter-clockwise cuts the bass response and turning the control clockwise boosts the bass response.

VARIABLE GRAPHIC EQUALIZER

Level Control

The Level Control cuts or boosts the frequency set by the Frequency Control directly beneath it. It is used in the same manner as a Graphic Equalizer. Starting at mid-position moving the slider towards +15 boosts and moving the slider towards -15 cuts that particular frequency.

Frequency Control

The Frequency Control select the center frequency that will be cut or boosted by the Level Control directly above it. If The Level Control is as "0" or mid-position, moving the Frequency Control will have no affect on the sound. The Frequency Control covers a three octave range.
To better understand how the Level and Frequency Controls work with each other, try the following example:
1. Set the Gain and Master Volume Controls for listening level.
2. Set all tone and level controls at mid-position and turn all frequency controls full counter-clockwise.
3. Strike the open "E" string on the bass and move the Level Control on the first band of your Equalizer to +15 (the Frequency Control should be set at 40 Hz which is the fundamental that the open "E" string produces). The change in sound and pressure levels is a result of the fundamental "E" note being increased by approximately 15db.
4. Keeping all controls in their present positions (Level Control at +15 and Frequency Control at 40 Hz) strike your open "E" string again and move the Frequency Control from 40 Hz to 160 Hz.
As the Frequency Control is moved from 40 Hz to 160 Hz you should hear two increases in volume. The first will be at 80 Hz or your first overtone (harmonic) and the second will be at 160 Hz or the second harmonic of your open "E" string. From the above example a few things come to mind. One, there's a lot of information contained in one note on your instrument. Two, if one position of the Frequency Control give a much louder sound or volume, you may have found the area of greatest efficiency of your speaker cabinet. And, three, the tonal variations you can achieve with the Variable Graphic are just about infinite!

TREBLE CONTROL

The Treble Control is a shelving type tone control that cuts or boosts the high frequencies. Starting from mid-position, turning the Treble Control counter-clockwise cuts the highs and turning the control clockwise boosts the high frequencies.

MASTER VOLUME

The Master Volume controls the volume of the internal power amplifiers, the level at the crossover high and low jacks, the effects send jack and the XLR out jack when switch in the "line" position. It should be used in conjunction with the Gain control to achieve maximum signal to noise ratio.

CROSSOVER FREQUENCY

The Crossover Frequency sets the crossover point or dividing point of the "High" and "Low" jacks. For example, if the Frequency Control is set at mid-position or 500 Hz, all frequencies below 500 Hz will appear in the "Low" output jack and all frequencies above 500 Hz will appear at the "High" output jack.

If you are still confused on how to set the crossover point, you can refer to the owner's manual that should come with your speakers. Another reference, which is probably best, is your own ears. Once you have correctly set up the system, rotate the Crossover Frequency control until the sound seems balanced or simply, just sounds the best!
Crossover slope is 12db per octave.

BALANCE

When the SM-400 is used in the stereo mode, the Balance control sets the levels of the left and right channels with respect to each other. Rotating the Balance control to the "l" or left, cuts the level of the right channel and vice-versa.
If you are running your system in the bi-amp mode, and you have selected the left channel for the low frequencies and the right channel for the high frequencies, adjustments can be made as follows:

BALANCE CONTROL

More lows and less highs can be accomplished by rotating the Balance control counter-clockwise (towards the left). More highs and less lows can be accomplished by rotating the Balance control clockwise (towards the right).

POWER SWITCH

Moving the Power Switch to the "On" position will turn on you amplifier as indicated by the LED lighting.

REAR PANEL FEATURES

BALANCED XLR OUT

The Balanced Out is a true balanced output and serves two functions. In the "Direct" position, the Balanced Out serves as a direct box and can be used for recording or patching into a house P.A. System. No controls on the front or back panel affect the signal appearing at the XLR connector except the "XLR Pad." In the "Line" position, all controls on the front and back panels control the signal appearing at the XLR connector and the level is set by the Master Volume.
The "Line" position can be used for recording directly into a tape machine as well as going directly to the studio board. An external power amplifier with a balanced input can be driven in the "Line" mode.
Pin out for the XLR connector are as follows:
Pin 1 = Ground Pin 2 = + Pin 3 = -
For a few dollars, you can buy an AC wall socket tester. A light comes on if the AC socket has been wired correctly. We recommend having one of these if you value your equipment.

HIGH AND LOW OUT JACKS

The Crossover "High" and "Low" out jacks have been provided for bi-amping capabilities. Present at the "Low" jack are all frequencies below the point set by the Frequency Control. Present at the "High" jack are all frequencies above the point set by the crossover or Frequency Control. All patching from these jacks should be done with shielded cable.

HIGH AND LOW OUT JACKS

Using the SM-400 for Bi-Amping Using high quality shielded cable, run a patch from the "Low" out jack into the "Left" stereo effects return jack and a patch from the "High" out jack to the "Right" stereo effects jack. Next, make sure the Power Amp Assign switch is in the "Stereo" position. Now, hook up your low frequency speakers to the "Left" speaker output jack and your high frequency speakers to the "Right" speaker output jack. Correct levels or balance between highs and lows can be achieved with the "Balance" control located on the front panel.
The SM-400 can be used for amplifying just the low or high frequencies! To accomplish this, run a patch from either the high or low crossover out jacks to the "Mono" effects return. Switch the Power Amp Assign switch to "Bridge" and use the banana jack for your speakers.

EFFECTS

The Effects Loop is provided for use with any external effect such as a Chorus or Stereo Flanger, etc. Using the Effects Loop lowers the noise heard at the speakers generated by the effects unit. The output and input impedances seen at the "Send" an "Receive" jacks were designed to give optimum performance from effects units both new and old.
If you have a mono effect, run a shielded cable from the "Send" jack to the input of the effects unit and another from the output to the "Return Mono" jack. If a stereo effects unit is used, run separate cables from the left and right outs of the effects to the "Left" and "Right" return jacks on the SM-400.
The patching capabilities incorporated in the SM-400 are nearly limitless. However, in some cases, wiring should be done by a qualified technician. If you have any definite needs or questions, please contact the factory for assistance.

POWER AMP ASSIGN SWITCH

If you wish to run your amplifier in the stereo mode, move the Power Amp Assign Switch to the "Stereo" position.
Operation in the bridge mode is achieved by the Power Amp Assign Switch being in the "Bridge" position.
The position of the Power Amp Assign Switch will be determined by the way you wish to use the SM-400 or the impedance

of the cabinets you intend to use. If you don't find the information you need in this owner's manual, please contact the factory for assistance.

LEFT & RIGHT SPEAKER FUSES

The left and right speaker fuses are provided to protect your speakers in the unlikely event of a power amp failure or incorrect hook-up procedures. Size and rating of the fuses are 3AG, 8 AMP, Fast Blo. Do not defeat the purpose of this feature by using a higher rated fuse.
The speaker fuses can open if there is a fault in the speaker cable or the speakers themselves. Therefore, it is always wise to carry extra fuses at all times.

SPEAKER OUTPUT JACKS

When used in the stereo mode, the internal power amplifiers of the SM-400 will deliver 300 watts @ 2 ohms, 240 Watts @ 4 ohms and 140 Watts into 8 ohms. Optimum performance will be achieved by using a total of 4 ohms per channel. When using 2 ohms loads, the amplifier will run hotter than normal. Minimum load in the stereo mode is 2 OHMS!
When used in the Bridge mode, the SM-400 will deliver 250 Watts into 16 ohms, 400 Watts into 8 ohms and 420 Watts into 4 ohm loads. Make sure the speakers you use in this mode can handle the power. Minimum load in the bridge mode is 4 OHMS!

LEFT & RIGHT SPEAKER JACKS

The Left and Right speaker jacks are provided for use in the Stereo Mode only. DO NOT use these jacks when the SM-400 is switched to the Bridge Mode. Balance between left and right channels can be obtained by using the Balance Control located on the front panel. Make sure all speakers are hooked up BEFORE turning on the SM-400. Never plug or unplug your speakers while the unit is on. Always use speaker cable
(not shielded cable such as used for patching or your instrument) of an 18 gauge rating or heavier. The heavier the wire, the lower the gauge.

BANANA JACK

The Banana jack is provided for use in the Bridge Mode only. A six foot speaker cable is provided with each unit for your convenience. Optimum performance from the SM-400 will be obtained by using an 8 ohm speaker cabinet. More than one cabinet can be used in the Bridge Mode by stacking banana jacks. You can stack the banana plugs coming straight out of the banana jack on the amp (Most banana plugs are made so that you are able to plug one into the rear of the other). Then connect the 1/4" ends to each respective speaker enclosure. If you have any questions in this area, please consult the factory for assistance BEFORE experimenting. Make sure all hook ups are complete before turning the unit on.
Note: The frequency response of the SM-400 is far greater than usually found in musical instrument amplifiers (10 Hz to 40K Hz). This is done to give the bass player the same punch and clarity on stage as found in the studio or concert P.A. Systems. Therefore, it is doubly important that the user be aware of the impedance and power rating of the speakers they intend to use and that they are compatible with the SM-400.

LINE OR MAINS FUSE

The size and rating of the Line Fuse is 3AG, 7 Amp, Slo Blo. NEVER replace this with a fuse of a higher rating as it will void your warranty.

INTERNAL FEATURES

VACUUM TUBE (VALVE)

As stated earlier, SWR installs a specially selected 12AX7A dual triode from Groove Tubes. If this tube needs replacing, we recommend you replace it with a similar high quality product. This tube will need replacing only if it becomes noisy or microphonic (sounds like glass tinkling in the background of certain notes), or completely fails causing no signal.

CONCERNING CHASSIS HEAT

One of the most asked questions about our amplifiers is why they tend to get warmer than other amps. The chassis of your amplifier can get quite warm during normal usage. This is especially true if you are using a 4 ohm total impedance in the Bridged mode. This is because a 4 ohm impedance (or 2 ohms per channel in the Stereo mode) introduces the least efficient condition of the unit (ie: power drawn from the outlet in relation to power produced in the speakers). The difference in these two figures can be as high as 300 Watts. This would be the equivalent of putting a 300 Watt light bulb inside a metal box which would obviously get quite hot.
Most musical instrument amplifiers on the market today use steel for their chassis which, in most cases, is considerably cheaper than aluminum and does not conduct heat as well as aluminum. SWR uses all aluminum chassis because they have less impurities than steel, are less susceptible to rust and it is a better conductor of heat. This results in the chassis acting as a heatsink drawing heat away from heat producing components inside and thus extending their life. In this manner, we feel we have produced a more reliable amplifier, but, at the same time, the outside of our units will get warmer than cases made out of steel.

The only condition you should be aware of is if one or more of the power amplifiers in your unit becomes "over biased." This condition can be recognized by turning your amplifier on and letting it sit without speakers plugged in and without playing it. If, under these conditions, your unit becomes quite warm, it may be over biased. This situation should be attended to and can be easily remedied in about 15 minutes by a service tech. A power amp can become over biased through continuous vibration or by any large jolt received in shipping, etc.
NOTE: UNITS MANUFACTURED AFTER SEPTEMBER, 1993 AND HAVING A SERIAL NUMBER GREATER THAN #6125 HAVE AN INTERNAL COOLING FAN.